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BY

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The traveller in Europe sees everywhere the architectural remnants of by-gone periods of time. On the banks of the rivers, in the valleys, on the hill tops and mountain sides, in the hamlets and in the midst of cities, these time-stained, ivy-covered remains present themselves; some are simply a mass of ruins, some are in partial repair, while many have been carefully preserved or restored. There are castles and abbeys, fortresses and monasteries, chateaux and cathedrals, and many humbler places of worship. Besides these there are walled cities, surrounded by deep moats and arched gateways, flanked by huge towers, all telling of a tumultuous past, strangely associated with much religious enthusiasm. Everywhere one meets also throngs of visitors wandering through these relics of dead centuries, to many of whom they are merely food for curi-

osity ; but to the thoughtful and studious they possess a deeper interest, while to the statesman and philosopher they are object lessons of grave import. Each has a history of its own—of tragedy, comedy, or romance, and all have had more or less influence in shaping the events with which they were contemporaneous. For the most part they were erected during that indefinite period of time which the writers of history have designated as the Middle Ages, extending, according to some, from the fifth to the tenth century ; according to others, from the fifth to the fifteenth century, or from the fall of the Roman Empire to the Protestant Reformation, a period of about ten centuries. It is impossible, however, to assign closely defined limits to great social revolutions ; they have their origin in occurrences long antecedent to their actual development, and their results extend far beyond their apparent termination. More particularly is this the case with the Medieval era. The field of its activity was limited in extent, in comparison with the momentous events of which it was the theatre. Reaching from the Mediterranean to the Northern seas, and from the Bay of Biscay to the Black Sea, it had on the north a vast area of uninviting forest, and to the south a broad expanse of cheerless desert ; yet from that forest and from that desert came the overwhelming hordes of barbarism that crushed out the dawning civilization of the world, and for long centuries held in check every effort of man towards a higher plane of existence. There was an utter destruction of all forms of law and order, a breaking down of all the barriers erected for the protection of life and property, ending in the com-

plete annihilation of empires and kingdoms whose people had attained a degree of refinement and culture until then unknown, leaving nothing in their place but a waste of irretrievable ruin and desolation, the abode of ignorance and superstition; and yet within a period of a thousand years there emerged from out of this chaos the present nations of Europe. Just how this marvellous hiatus in the progress of humanity commenced, continued and ended forms a most interesting chapter, not only of political history, but of physical geography. The forces that were called into play were gigantic in their character, conflicting in their operations and stupendous in their results. These forces were the threads from which was woven, by the hand of time, the vast and complicated fabric of European civilization; their variegated colors form the tapestry of history. Underlying all and dominating all are the geographical conditions that determine the foundation and limit the duration of nations.

The true character of the medieval period is found in a comprehensive answer to these three questions: Whence came the early civilization of Europe? Whence came its destruction? Whence came its revival?

This great globe of ours, on which cartographers have delineated five zones of temperature, has other zones not so sharply defined, but more absolute in their character and more potential in their influence. One of these is the zone of greatest production, towards which the human race gravitates of necessity, for beyond it life is a long and arduous struggle for a mere existence, without progress and without development. History tells us that this is also the zone of civilization,

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along which the path of empire has moved around the world. Within this zone lies the heart of Europe where the medieval drama was enacted. For long centuries this was an unknown land to the people of the East. The banks of the Euphrates, the Indus and the Nile teemed with the busy life of cities and towns, the opulent centres of oriental magnificence. Nineveh and Babylon, Thebes and Luxor had risen to their zenith and fallen into decay, while yet the whole of central Europe was a vast primeval forest, the abode of wild beasts and roving bands of savages. As a knowledge of geography and navigation developed among the Eastern people, and the Mediterranean became a channel of commercial intercourse between the continents, the shores of this great inland sea and the peninsulas extending into it began to be peopled and a new era dawned upon the world. The spell of orientalism was broken! This offspring of superstition and slave of sensuality until then had held under its baneful influence all there was of civilization,

> "While wrapped in sleep earth's torpid millions lay,
> Hugged their vile chains, and dreamed their age away."

Orientalism was to lose its sway. The Occident and not the Orient was henceforth to dominate in the affairs of men. On the continent of Europe was to be opened a nobler field for human progress.

The colonization of the shores of the Mediterranean gave birth to a new race through whose active energies a higher plane of physical, mental and spiritual development was to be reached. How grand! how magnificent! how heroic was that development! how marvellous the story, so familiar to all and yet of never-ending interest!

The chief element in the civilization that centred in Greece and Italy and culminated in the erection and expansion of the Roman empire until it extended over the greater part of Europe, northern Africa, eastern Asia and the islands of the sea, was the geographical conditions that characterized these two peninsulas, without which, in all probability, there would be much less of their history worthy of record. Their peninsulated position contributed in a large measure to that defence against outward foes so essential to their early development, while their internal geography moulded their national character and shaped their destiny.

The most obvious peculiarity of the geography of Greece is its remarkable richness in mountains, bays and islands, which give it unexampled national defences, unusual maritime advantages and a peculiar variety of climate, vegetation and scenery. In this respect it but gathers into a smaller page, and expresses in a distincter type, the structural peculiarities of the continent to which it belongs. In the complexity of its make and the variety of its natural features, Greece excels every country of Europe, as Europe excels every continent of the world. Greece, like Europe, is divided by its mountain chains into a number of independent parts. The basins of arable land between the hills maintained comparatively isolated populations on account of the difficulty of inland communication, and naturally developed that individuality of character, that local patriotism and that political independence which marked the Greek communities; and the great variety of pursuits, interests and stimulus which the geographical features of the country created could not

fail to conduce to the uncommon vigor, quickness and versatility which the people exhibited. The Greeks owed their greatness largely to the physical geography of the country it was their good fortune to inhabit. We have here, at a glance, the source of that Hellenic development which exerted such a powerful influence over succeeding ages. What there was of civilization in Rome was due to Hellenic influences. Greece, the centre of the highest form of outward culture that the world has ever known, shed the glory of her genius over the nascent civilization of Italy, and gave to it all that it possessed beyond the barbaric force that enabled it to overrun with its armies the continent and the islands of the sea. Greece, where the beautiful and sublime in art combined with the highest skill, was enabled not only to Hellenize Rome, but even in her ruins to Hellenize the civilized world of to-day. Two thousand years of effort have left only imitations of her genius. It was this culture, this refinement, that was to be brought face to face with the barbaric hordes of the north. Rome in her conquests had absorbed the once glorious republic, but had not destroyed her intellectual influence. Rome had undertaken to beat back the invaders, and for long years her legions had checked the advancing tide, but the surging waves rolled on. Time after time they were cowed into subjection under the influence of wonderful strategic skill. Forty thousand miles of military roads penetrated every portion of the continent, reaching even into Asia; to facilitate the movement of the armies and connect the military posts and colonies, an unrivalled organization and system of administration was everywhere established. The

Roman people and the Roman armies were stimulated to the highest degree of patriotism and courage. Rome itself became a magnificent city of palaces; along her marble porticos victorious leaders rode in ivory chariots at the head of triumphal processions, followed by their captives in chains, amid the exulting shouts of the multitude. Adventurers from every clime flocked to her standard; the whole empire became a vast recruiting depot—but all in vain.

During the centuries of Greek and Roman development the population of the earth had immensely increased; space and food were required to sustain this increasing human life; the heart of Europe afforded the only refuge for the starving masses of the north and east. For æons of ages the preparation for this epoch in the life of the world had been going on. The gigantic forces of nature had been at work completing the geography of the continent. The climatic influences, largely due to the Gulf Stream, by which the chilling blasts of the north and the burning winds of the south were alike tempered in their intensity, had prepared the way in that fertile soil and luxuriant vegetation that were to afford the sustenance demanded by the teeming millions. The avalanche and the glacier had been doing their work grinding down the Alps and the Jura, while the great Rhine river spread the debris over the bed of the Northern Sea until it rose above the waters, to create a home for powerful and opulent nations that were to be. It was nature's fiat that the supremacy of the world should pass from Rome—hunger was stronger than her walls, and greed more powerful than her armies. Rome fell! but not in a day,

or a year, or a century. Her fall was as much the result of centuries of disaster as her rise had been that of centuries of progress. Her growth was due to ever-changing and unforeseen conditions. A purely military government, its wealth was the spoils of conquest and not the fruits of industry or thrift. The barbarians learned its weakness while being taught its strength. In time barbarian soldiers filled the ranks of its legions —barbarian commanders led its armies, and barbarian emperors sat upon its throne. Its grandeur and its splendor became the cloak for the lowest forms of vice and crime, and thus the transition was gradual from glory to shame. The extremes of barbarism and civilization met, as they always will meet to the end of time.

And now for a thousand years the most conflicting elements were to struggle for the mastery amid the ruins of an extinct dynasty. Anarchy reigned supreme. There was no law but the law of force ; none to administer justice, none to protect the weak against the strong. There was, however, one element that survived the wreck of empire—it was the Christian Church. Persecuted and despised for centuries, it had never abandoned its faith, but continued to fight out the battle against paganism, only to find itself arrayed against Islamism. When the Emperor Constantine abandoned paganism and adopted Christianity, he assumed the unqualified and absolute protection of the Church. Persecution ceased, and Christianity, rising from the cross to the throne, became an integral part of the imperial system. The priestly functions assumed an air of princely grandeur, gorgeous robes and elaborate ceremonies were added to the religious exercises, and

the head of the Church became a power in the State. By imperial decree, vast territories were added to its possessions everywhere, involving a system of secular administration on a large scale, and adding greatly to its revenues and power, while creating a condition of dependencies and vassalage second only to the empire itself. It was under these circumstances and in the absence of any other semblance of authority that the Roman Pontiff grasped the sceptre that had fallen from the hand of Caesar, and proclaimed the secular supremacy of the Church. An empire of peace was offered to replace the empire of war. Persuasion was to take the place of force. Every effort was made to Christianize the idolatrous hordes, and draw them within the pale of the Church, with but little success. The savage bands had come to the feast of the vultures. The ghouls of barbarism were fattening on the carcase of the dead empire; with them moral force had no more potency than a wisp of straw—without fear and without reverence—anathemas did not terrify nor blessings tempt them. Tribal chieftains assumed the dignity of feudal lords; each, gathering his clans, seized upon as much land as he could defend, erected his castle, and bid defiance to all comers. In time the whole Continent was dotted with these strongholds of feudalism, and feudalism became the dominant power. In this extremity the Pope found a powerful ally in Charlemagne—the grandson of that Charles Martel, who had at the battle of Tours checked the further progress of the victorious hordes of Islamism, that would have subjugated not only France but Europe. Charlemagne sustained the Pope in his assumption of temporal

authority, and at Rome was by him crowned Emperor of the "Holy Roman Empire." But on the death of Charlemagne the old order of things returned—the feudal chiefs became feudal barons and their castles multiplied. They studded the banks of the Rhine and exacted tolls from its commerce — the strong made forays on the weak—slavery in the form of serfdom was universal, and the whole Continent was a scene of rapine and plunder — neither life nor property was safe.

In the midst of all this there arose another power which was destined to wield a commanding influence—this was the civic power, or the municipalities. Commerce drew the merchants and the artisans to the cities, which, increasing in number and in wealth, became an important factor in the life of the period. Amid the general disorder they were necessarily on the defensive, hence all the cities were fortified, and to this day the type of a European city is a vast fortress. Here there were three antagonistic forces, each striving for the supremacy—the Church, the cities, and the feudal lords, and for a long period these three conflicting elements of society stood at bay. Each of these is largely represented in the architectural monuments that remain as evidences of their power and importance; the cathedrals, the civic halls, and halls of the guilds or trades, and the feudal castles. A grand impulse was given to cathedral architecture in consequence of the wide-spread excitement and terror produced as the end of a thousand years from the birth of Christ approached. The belief was almost universal that at that date the end of the world would take place, and when it had

passed such was the joy and exultation that vast sums were lavished on temples of religion, as tributes of gratitude and thanksgiving for the lives that were prolonged. The castle was the domiciliary exponent of social and domestic life in the middle ages, just as the log cabin and stockade were the exponent of the social life of the pioneer in the early settlement of America. Universal rapine and turbulence made it necessary that the castle should be a fortress, just as the stockade was a necessity for the protection of the pioneer from the Indians. In his castle, the feudal proprietor led a semi-regal life; his vassals and retainers formed in time of need an armed force; its members proportioned to the means of support possessed by the feudal lord, and in the same proportion was the size of the castle. As a rule this was constructed in accordance with certain established principles of attack and defence, and all the castles had these principles more or less developed in their construction. The walls as a rule were very thick and composed of either quarried stone or concrete, whichever was most convenient, and sometimes of both. There was always a moat surrounding the outer wall, either wet or dry. The plan of the castle included two or more courts within the enclosure; the outer court for the retainers, the inner for the family and guests. In the outer court were the barracks, the armory, the stables, the guard rooms. On the outer wall was a walk for the sentinel. The entrance was defended by a barbican or outwork, with loop holes for musketry. The moat was crossed by a drawbridge, to which were attached chains and weights to raise or lower it. When raised it formed the closed door of the entrance; be-

hind it was suspended the portcullis, a massive structure of timber and iron to be lowered as a defence of the sally-port or entrance. In the inner court were the banquet hall, the chapel, and the living rooms. The donjon or keep was a strongly built structure for final retreat if the outworks were captured; the wall of the keep was very massive. Within this were the prison cells. Frequently there were walled enclosures attached for gardens and tournament grounds. Wild and lawless as were for the most part the lives of the men, there was to be found within the castle a certain degree of refinement, and as social order advanced, the influence of the women began to be felt, but it was not until after the Crusades that the full force of this influence developed itself.

The Crusades were in many ways the salvation of Europe. Their original object is lost sight of in the effect they had upon the social order of the Continent. Their origin, their long persistence through a period of 200 years, the barren results obtained compared with the enormous cost and immense sacrifice of life, the extraordinary moral contagion that induced so many hundred thousand men to sacrifice their lives, the amazing credulity and blind faith that constituted their chief stimulus, form perhaps the most extraordinary chapter in human history. Their effects, so different from their objects, were felt for centuries. Their influence in the social and political condition of Europe made possible a revolution that no other force could have accomplished.

Starting with the preachings of Peter the Hermit, a ragged mendicant on a donkey, who had witnessed the

cruelties practised by the infidels on the Christian pilgrims to Jerusalem, they aroused the deepest interest of the Popes, and created an enthusiasm bordering on insanity. The rescue of the Holy Sepulchre from the Saracens was the universal and absorbing thought of all Christendom. First the dregs of the population, without arms, provisions, or organization, started across the continent by hundreds of thousands, only to die by the wayside or to perish by the hands of the Hungarians. Then came armies, commanded by kings and emperors and princes and lesser potentates. When all else seemed to fail, fifty thousand children, boys and girls, were hurried to the scene in the wild hope that God would through their innocence accomplish what sinful men could not. All died or were sold into slavery by the Saracens. Horrible as is the recital of folly, misery and suffering, a great good was to come out of it. First, it destroyed the power of feudalism through the impoverishment of so many feudal lords who gave up all for the cause, and the enrichment of a few who were wise enough to stay at home and acquire vast territories and wealth. Some of the feudal chieftains becoming thus more powerful than their fellows, assumed kingly prerogatives, and gradually the monarchial expedient of government was accepted as a relief from general disorder. It was accepted by the ecclesiastics, because their authority in spiritual matters was recognized and their vast possessions protected. It was accepted by the municipalities, because their independent status was conceded and their privileges were not disturbed. It was accepted by the lower orders, because there was for them no alternative, and thus, in course of

time, the people of Europe passed under the control of hereditary monarchies, whose history for the subsequent centuries, with rare exceptions, is but a sad story of wrong and outrage, of bloody wars and revolutions, of internecine strife — of profligacy and imbecility— on the part of rulers, and a universal suppression of individuality among the masses. This so called monarchial principle of government of man, although a mere expedient, sustained by arms and tolerated through fear, was the one ray of sunlight in the mediæval darkness, and through it social order was in a measure secured. The people gathered around the thrones that were set up, and the land by slow degrees was partitioned off into Kingdoms, with their boundaries defined by natural features, mountain ranges or large rivers. In short Europe became a nursery of nations, for which the continent is so well fitted by its geographical conditions.

In addition to this, through the Crusades the diverse people of the two continents, as well as those of Europe itself, were brought face to face with each other, to the advantage of all. Commerce was stimulated, knowledge was diffused. In fact, like our Civil War, the Crusades were a blessing in disguise, the results of which will be felt for unmarked ages.

Out of the Crusades came also the institution of Chivalry, an element of strength and power that exercised for several centuries a commanding influence in the social, political and religious world. Knighthood had its origin among the invading German tribes, being the offspring of that stoicism or indifference to every form of physical pain and suffering, which has always

elicited the admiration and respect of man in his primitive condition. It has been the supreme test applied to the candidate for chieftainship among our North American Indians. By degrees this became an important element in the feudal system, and those who showed themselves most qualified by endurance of hardship, after severe tests, were enrolled as Knights or mounted attendants on their lords. Subsequently the conferring of Knighthood was attended with religious ceremonies, and the qualifications became more and more exacting until the twenty-six articles that the Knight subscribed to seemed to include every possible virtue and exclude every possible vice. Certain it is that a noble order of manhood was established, the influence of which has been indelibly stamped upon civilization everywhere.

The revival of civilization and the intelligent reconstruction of social order, was in a large measure the preservation of the intellectual forces under the auspices and through the masterly organization of the Christian Church, which survived all the changes and mutations of that turbulent period with a vitality almost unimpaired. The monks in their monasteries preserved and fostered the records and the intellectuality of the past, and in their gardens preserved and fostered the seeds and plants that would otherwise have vanished from the face of the earth, and thus it would appear that the imperial protection of Christianity had in it a marvellous foresight; that it was to be the agency for perpetuating that knowledge which would otherwise have passed into oblivion. The world will never know the full extent of its obligation to those religious devotees who have transmitted to futurity the knowledge of a

thousand truths in science and nature, the blessings of which we now enjoy. The crumbling ruins of abbeys and monasteries are the mute evidences of the years of their fidelity, zeal and patient industry. All differences in creed are lost sight of in the contemplation of the great good that has thus come to mankind.

It is not intended to assume, however, that the entire intellectual force of the Middle Ages was confined to those in holy orders. On the contrary, the literature of that period is filled with examples of the highest order of genius, entirely outside the pale of the Church, showing brighter from the contrast with the surrounding gloom. The crowning of Petrarch with the laurel wreath amid the ruins of Rome is a striking evidence of this. "Nothing (says Macaulay) can be conceived more affecting or noble than that ceremony; the superb palaces and porticos by which had rolled the ivory chariots of Marius and Cæsar had long mouldered into dust. The laurelled fasces, the golden eagles, the shouting legions, the captives, and the pictured cities were indeed wanting to his victorious procession. The sceptre had passed away from Rome, but she still retained the mightier influence of an intellectual empire, and was now to confer the reward of an intellectual triumph. To the man who had extended the dominion of her ancient language, who had erected the trophies of philosophy and imagination in the haunts of ignorance and ferocity. whose captives were the hearts of admiring nations enchained by the influence of his song, whose spoils were the treasures of ancient genius, rescued from obscurity and decay, the Eternal City offered the just and glorious tribute of her

gratitude, amid the ruined monuments of ancient and the infant erections of modern Art; he who had restored the broken link between the two ages of human civilization was crowned with the wreath which he had deserved from the moderns who owed to him their refinement, from the ancients who owed to him their fame. Never was coronation so august witnessed by Westminster or Rheims."

The troubadours and minnesingers were the outcome of feudalism, and formed prominent features of feudal life. The isolation of the castles was peculiarly adapted to foster the existence of those roving singers, who either singly or in parties went from castle to castle to entertain the dwellers with their improvised songs and music.

The rise of the monarchial principle, while it broke the power of the feudal lords and so tamed their predatory habits, did not destroy the system—it improved it—and under the new order of things, castle life developed many refining influences. The position of women was improved and their habits and manner of life took on a new coloring. One of the chief characteristics of knighthood was a manly devotion to woman, and the improvised strains of the troubadours largely partook of the tender sentiment. It was an age of romance; in fact the word originated in the tales that were told in the mixed language of the barbarians and the Latins.

In the heart of Germany there is one old town that above all others bears the stamp of the better side of the Middle Ages, and of its later life; it is a spot dear to the antiquarian, and hallowed by gentle reminis-

cences of the poets and painters of that period. Its quaint old houses have a charm that is found nowhere else—a medieval atmosphere still hovers over its gabled roofs—medieval echoes seem to follow the footsteps in its narrow streets, and medieval shadows linger on its walls. Would that time and progress might turn aside and leave old Nuremberg forever undisturbed! How lovingly Longfellow responds to the witchery of its influence:

NUREMBERG.

In the valley of the Pegnitz, where across broad meadow lands
Rise the blue Franconian mountains, Nuremberg, the ancient, stands;
Quaint old town of toil and traffic, quaint old town of art and song,
Memories haunt thy pointed gables, like the rooks that round them throng.

Memories of the Middle Ages, when the Emperors, rough and bold,
Had their dwelling in thy castle, time defying, centuries old;
And thy brave and thrifty burghers boasted in their uncouth rhyme,
That their great imperial city stretched its hand through every clime.

In the court-yard of the castle, bound with many an iron band,
Waves the mighty linden planted by Queen Cunigunde's hand.
On the square the oriel window, where in old heroic days,
Sat the poet Melchior singing Kaiser Maximilian's praise.

Everywhere I see around me rise the wondrous world of art—
Fountains wrought with richest sculpture standing in the common mart,
And above cathedral doorways saints and bishops carved in stone,
By a former age commissioned as apostles to our own.

In the church of sainted Sebald sleeps enshrined his holy dust,
And in bronze the twelve apostles guard from age to age their trust;
In the church of sainted Lawrence stands a pix of sculpture rare,
Like the foamy sheaf of fountains, rising through the painted air.

Here, when art was still religion, with a simple, reverent heart,
Lived and labored Albrecht Dürer, the evangelist of art;
Hence in silence and in sorrow, toiling still with busy hand,
Like an emigrant he wandered, seeking for the Better Land.

EMIGRAVIT is the inscription on the tomb-stone where he lies;
Dead he is not—but departed—for the artist never dies.
Fairer seems the ancient city, and the sunshine seems more fair,
That he once has trod its pavement, that he once has breathed its air!

Through these streets so broad and stately, these obscure and dismal lanes,
Walked of yore the master singers, chanting rude poetic strains.
From remote and sunless suburbs, came they to the friendly guild,
Building nests in Fame's great temple, as in spouts the swallows build.

As the weaver plied the shuttle, wove he too the mystic rhyme,
And the smith his iron measures hammered to the anvil's chime;
Thanking God, whose boundless wisdom makes the flowers of poesy bloom
In the forge's dust and cinders, in the tissues of the loom.

Here Hans Sachs, the cobbler-poet, laureate of the gentle craft,
Wisest of the twelve wise masters, in huge folios sang and laughed;
But his house is now an ale-house, with a nicely sanded floor,
And a garland in the window, and his face above the door;

Painted by some humble artist, as in Adam Puschman's song,
As the old man, gray and dove-like, with his great beard white and long;
And at night the swart mechanic comes to drown his cark and care,
Quaffing ale from pewter tankards, in the master's antique chair.

Vanished is the ancient splendor, and before my dreamy eye
Wave these mingling shapes and figures, like a faded tapestry;
Not thy councils, not thy kaisers win for thee the world's regard,
But thy painter Albrecht Dürer and Hans Sachs, thy cobbler bard.

Thus, O Nuremberg, a wanderer from a region far away,
As he paced thy streets and court-yards, sang in thought his careless lay;
Gathering from the pavement's crevice, as a floweret of the soil,
The nobility of labor, the long pedigree of toil.

LIFE IN THE WILDS OF CENTRAL AFRICA.

BY

E. J. GLAVE.

Upon Stanley's return to Europe, after his memorable journey "Through the Dark Continent" in 1877, several influential and philanthropic gentlemen, recognizing the mutual benefit that would accrue from the opening up, by civilization, of the heart of Africa, formed themselves into a society entitled L'Association Internationale Africaine of which King Leopold II. was the president.

Stanley, having taken a few month's rest to recuperate his health, so enfeebled by illness and hardships during his travels, returned to the Congo River in command of a big expedition under the auspices of the new society, and he was engaged in founding along the course of the river a line of garrison stations, which should form the nucleus of a government destined, ultimately, to rule these vast territories so aptly described as the Dark Continent, and to hold in check the westerly advance of the Arab slave hunter.

In 1885, at the Berlin Conference, the powers of Europe and America recognized the government, established over the Congo basin by Stanley, as the Congo Free State. This new state was duly empowered to employ all civilized means for the institution of law and order in its territory.

In 1883 I became an officer of this association under

curious circumstances. Fascinated by the prospect of the stirring adventure and the novel experience of life in that mysterious land, I applied for a foreign appointment in the service of the Society. A few days after posting my long, imploring letter, I received a courteous reply, informing me that their expedition was already fully manned, and moreover, at any time, they needed only experienced men. At that time I was but nineteen years of age and certainly was not qualified to style myself an experienced man. But the fact of the Society deigning to reply at all gave me strong hopes, and I continued to bombard those gentlemen with my lengthy communications till one Saturday I received a cablegram, instructing me to leave Liverpool on the following Tuesday morning, proceed to Africa, and join Stanley on the banks of the Congo River.

I really believe that they gave me the appointment rather than submit to the incessant worry of receiving and answering my pestering letters.

Since that time I have lived for 6 years in the wild regions of Congoland, and for the greater part of that time the natives were my only companions, which afforded me an unusual opportunity to study their social condition; and I will employ the occasion, granted me by the American Geographical Society, in narrating facts, adventure, and anecdote tending to convey an idea of life in Central Africa, and I will endeavor to portray some of the eccentricities and peculiar characteristics of the villagers.

The Congo River is navigable from its mouth a little over a hundred miles, then a succession of wild waters and rapids, extending almost continuously from Vivi

to Stanley Pool, renders an overland march of 250 miles necessary before the navigable waters of the Upper Congo are reached. The only means of transport over this distance is by manual labor; all merchandise provisions and boats in sections or plates have to be carried or dragged overland by men. The peaceful, industrious tribes of Ba-Congo are engaged for this purpose, and they receive in payment for their services cotton stuff, brass wire and beads. Though these people are lean, slender-shanked individuals, they possess a wonderful power of endurance. They will travel 25 miles a day, tramping up and down steep high hills, and through the sweltering heat of the stifling valleys, carrying loads weighing 65 lbs weight, and in spite of their arduous duties their nourishment consists only of a few handfuls of peanuts, a banana or two, and occasionally a few inches of dried snake or a smoked field-mouse. At points along the trail markets are held; the natives of the surrounding country meet under the shelter of spreading trees and exchange the produce of their several localities. At such places the white traveller and his carriers are able to obtain provisions for their journey.

At these gatherings, honesty and peaceful behavior are sternly enforced; the man who draws a knife in anger is killed; he is stoned to death and his body thrown into a shallow pit dug in the corner of the market place, and in the mound over the grave an old flint-lock musket is driven down barrel foremost until only the stock shows above ground as a headstone warning all to respect tribal law.

On our way to the interior we passed several skele-

tons lashed to the tops of tall poles erected near the highways, and we learned that these were the ghastly relics of criminals punished thus for theft.

To men newly arrived from civilization, the village burial-place presented a curious aspect, for the final resting-place of a Lower Congo chieftain is marked by a grotesque display. All the cheap crockery which deceased had been able to collect during his lifetime is strewn in an oblong path on the grave and surrounded by a suggestive little margin of gin bottles. Each article is broken in some way so that there is no inducement for any one to despoil the sacred memorial.

By the month of July, 1883, I had ascended the Congo River from its mouth a hundred miles in a boat, marched overland through the cataract regions and reached Stanley Pool at the commencement of the navigable waters of the Upper Congo, and I had reported myself to my chief, Stanley, who was living in a grass-thatched clay house at Leopoldville, the headquarters of the expedition. At that time the settlement was in its infancy; to-day it is the most important place in Central Africa. It is the active centre of the Congo Free State, and is the commencement of navigation on the Upper Congo; here all boats are put together, all stores, arms and ammunition are distributed from this point, and every expedition equips itself at this depot.

At the time of my arrival, Stanley was planning a journey on the upper waters of the Congo. He had not visited these regions since 1877, and then the savage beings of the far interior answered his words of peace and friendship by flights of poisoned arrows and glistening spear-heads, and their war cry of Niama! Niama!

(meat! meat!) warned Stanley and his followers of the ghastly fate in store for prisoners.

Stanley was determined to establish peace with these cannibal tribes, and for this purpose he proposed to found in the most populous districts, at intervals along the river, garrison stations in charge of white officers. After I had been at Leopoldville a few weeks, Stanley sent for me to come to his house, and he then told me of his intentions of making a journey and promised to give me command of one of the new stations, or rather he would appoint me to Lukolela, on the Upper Congo, 800 miles in the interior, at present a virgin forest. He would convey me up stream in the steamer and leave me at the place, then I might build a station, and when that was accomplished I might command it.

A few days after this interview, I embarked with Stanley on board the little "En Avant," a side-wheeler thirty-five feet long, and we proceeded up stream.

In September we reached my destination, Lukolela. As soon as Stanley landed, a slave was sent by the old chief through the village to beat an iron gong and summon all the headmen to a palaver. These natives had not forgotten the white man who floated past their village in 1877 with several large canoes and a strange craft, in which the crew used long paddles and sat facing the steersman. (This was Stanley's rowboat, the "Lady Alice," which played such a part in "Through the Dark Continent.") These people having no written language, have retained in their memories the most important events which have occurred; these being constantly mentioned become in time epochs of tribal history. "Arlekaki tendelé mboka bisu kala kala," mean-

ing "when Stanley (tendelé being the best pronunciation they could give his name) passed our village a long time ago," is one of the principal marks of time, and you constantly hear it mentioned. The Central Africans are great talkers, and in all their speeches they commence by referring to incidents which happened as far back as they can remember, and they tell of all they know, no matter whether it refers to the subject or not. For instance, a native accused by another of having stolen a fowl, will preface his denial by remarking, arlekaki, etc., etc. (when Stanley passed by our village). And from that time onward he will provide a most picturesque recital of his own good deeds in peace and war. How he had fought in the van of every tribal battle and returned from the fray victorious; how when the river was overflowing and fish were difficult to catch, the whole settlement would have starved had it not been for his cleverly handled nets; he alone remained sober when the remainder of the villagers were regaling on malatu (palm wine), and after giving a glowing account of his admirable characteristics, he will demand in injured tones: Am I the man to steal a fowl?

When the natives had to an extent recovered from the unusual excitement of a white man's visit, Stanley held a meeting with the chiefs, and giving them presents of cloth, brass wire, beads, and metal ornaments, received, in return, permission for me to build a station in the forest, about a mile above their settlement.

This transaction having been satisfactorily settled, it was agreed that I should undergo the ceremony of blood-brotherhood with the old chief Mungaba. The

custom of blood-brotherhood prevails throughout Africa, and its observance is the surest way of gaining the confidence of the native chiefs. It has with them a religious significance, and they conscientiously respect the rite. All African explorers have often owed their safety to the sacredness of the pledges given by chiefs whose favor and confidence they gained in this manner.

My prospective brother, Mungaba, and I took our places side by side, and a small incision was made in Mungaba's arm just below the elbow by one of my men, and one of the natives performed a similar operation on me. Our punctured arms were then rubbed together so that the blood might mingle, and during this part of the ceremony the circle of natives composing the audience repeated in a chanting chorus the duties which the one owed to the other henceforth. If one was sick the other had to attend him; if the one was at war his blood-brother must help him; all my cloth, brass wire, and trinkets, could be claimed by Mungaba; his hut and chattels belonged to me; my father and mother were his; his wives and daughters were equally mine.

Stanley waited to see me thus accepted into the bosom of an African family, then he and the remainder of the expedition embarked and proceeded up-stream, and I was left with seventeen Zanzibaris at Lukolela, in a dense forest, which had been far more familiar with the yawn of a leopard and the trumpeting of an elephant than with the human voice.

My first work was to obtain some sort of shelter. I made a small clearing by cutting down a few trees. Here I planted a small hut which I had purchased from

the natives. To complete my settlement in its embryo condition I erected a flag-staff, and hoisted the expedition colors, and, having no one in the district liable to be entertained by the remark, I whispered to *myself* that I was now chief of Lukolela. This was of course but a temporary abode, which would answer the purpose till I could construct a dwelling more substantial of clay with grass roof.

I soon realized that in order to get a truthful impression of my dusky neighbors it would be necessary to learn their tongue, and when the natives found out my intention they took the greatest interest in teaching me the words they thought most useful. They came into my hut at all times to supply me with the words that occurred to them. Some of the visits were made at very unseasonable hours. It was anything but a delightful experience to be rudely wakened, before the break of dawn, and find a great black woolly head reaching in the mosquito net, eager to assure me that *ngungé* was the native word for mosquito. However, by a persistent course of instruction received in this way, I soon passed from halting sentences to ordinary conversation, and after I had learned their tongue I ceased to feel lonely or look upon my neighbors as strangers.

When I had grasped their language several abbreviated forms of expression revealed themselves to me.

In all their legal discussions the word *nyo*, the utterance of which is accompanied by drawing the end of the first finger down from the inner corner of the eye to the mouth, is an emphatic negative, and plays an important part in legal debate. The Central Africans

have two words for no, *té* and *nyo.* The former word is weak and unreliable, and the native is not at all offended if you doubt his word when he uses it, but he will draw his knife in earnest to support his "nyo."

When an offender against some tribal law is delivering an oration in his own defence, he at first utters all his negative sentences in the affirmative, and then reverses them to the intended sense by the use of "nyo." The use of nyo is a convenient means of gaining the full attention of one's hearers, as it is tribal politeness for the whole audience to have their fingers ready to chime in with the speaker's nyo. The effect of this custom is very curious, as a chorus of lusty voices is added to the utterance of every negative.

The most forcible of the Congo abbreviations is the one expressive of absolute fulfilment of promise. It is a sound produced by screwing up the mouth into a whistling position, then blowing a sharp breath, and at the same time passing the hand rapidly across the mouth close to the lips, making a noise like the sudden escape of steam.

I will cite an instance of the use of this expression. An old chief named Manjimba one day visited my station and sadly narrated to me how his village had been surprised by an inland tribe of hostile natives, who had killed some of his people and taken others into slavery.

"Why don't you punish your enemies? you are able to do so. You have a fine following of stalwart warriors all well armed with spears, knives, arrows and shields. Why do your men carry such arms, if they remain inactive after such an unprovoked assault?"

Manjimba answered in tones of unmistakable deter-

mination: "Yes, I intend to fight them; before many days are passed my warriors and myself will steal through the forest and pounce upon the marauders at night. I will treat them in the way they treated me." Having uttered this threat he picked up his spears and shield, and, affably wishing me good-bye, he strode home to attend to the warlike project in hand.

After a few weeks the old chief returned to my station and stood in an imposing attitude before me. I at once recalled our last conversation, and asked him the result of the venture. A lusty puff of breath rendered into a mild explosion, by the rapid passing of the hand across his mouth of exhalation, was Manjimba's answer, after having informed me of the result of this expedition by this effective sign. A savage smile on the old warrior's face endorsed its meaning, which was, of course, that he had carried out his threat in its entirety.

In the equatorial regions of Central Africa, day and night succeed each other with but slight interval of twilight throughout the year. In these latitudes it is light in the morning at half-past five, and dark at half-past six. The rooster is the native alarm clock, his note proclaims the approach of dawn. One bird will give the signal at daybreak, his call will be answered by all the others one after another, till every rooster within hearing has taken part in the proclamation and warned everybody that it is time to get up. After this there is a lazy lull for half an hour, and then the day commences in real earnest amidst the strange hubbub of a Central African village. All the natives now leave their huts, and big log fires are soon blazing just out-

side the doorways. The old people cluster round these till the sun has risen and warmed the damp, cold morning air. The grown people defer their bathing or washing till later on in the day, when the sun is hot; but the helpless baby is not consulted as to his wishes on this subject. The Africans are a very hardy race, and I am convinced that it is to a great extent owing to their early introduction to the strengthening effect of cold water bathing. Every morning the women file down to the river edge to give their babies a bath. The mother walks knee deep into the stream, then catching the half-awakened infant by the waist, she dips him into the chilly water and holds him firmly as he wriggles beneath the surface. It always happens that several women are so occupied at the same time, and they naturally engage in conversation often of so interesting a character that the infant in the water is almost forgotten, till his frantic struggles and tugging warn the dusky parent that he is not amphibious. The child is then hauled out, but before he has time to recover, his violent spluttering and choking are again lost in the depths of the muddy stream. After repeating this operation four or five times, the mother carries the bewildered piece of ebonized humanity back to the village hut, and spreads him out on a mat in the sun to gradually recover from the shock. This seems to me to be rather a rough and uncomfortable means of providing for the survival of the fittest.

Everyday from about daybreak till noon the women work in their plantations of manioc-root, sweet potatoes, peanuts, yams and bananas. The men employ this part of the day for blacksmithing, carpentering,

hunting or fishing. When at mid-day the women who have been superintending the cooking announce that the meal is ready, all work at once ceases, and groups of ten or a dozen hungry darkies form around each earthen pot which is soon emptied by the natives' nimble fingers, which they use as both fork and spoon. When they do obtain these articles of cutlery from a white man, they punch a hole in the handle and wear them around their necks as jewelry. The staple food in this part of the world is fish and manioc-root with occasional dishes of elephant, hippopotamus, buffalo, crocodile, monkey and toasted caterpillar and paste of crushed ants.

After this meal the natives seek out the shady nooks of the village and, sheltered from the blistering heat of the noon-day sun, they attend to their odd but elaborate toilets. Far away in the heart of Africa, on the shores of the Congo River, though there are no milliners or outfitters to issue fashion plates nor a "four hundred" to lead the mode, still the dusky savages are keenly ambitious to appear stylish according to their tribal ideas and customs. Hair-dressing is one of the principal obligations and constitutes one of the duties of the "fair" sex. The woman sits down on a reed mat and the man upon whom the operation is to be performed reclines at full length, resting his head on her lap. She then ravels out his hair and with a coarse wooden instrument, resembling a child's toy rake, she combs it thoroughly until it is clear of all entanglements, and stands out all over the head in a thick bushy mass 6 or 7 inches deep. It is now generously greased with oil, then parted off into sections and cleverly woven

down close to the head, and the ends are arranged according to the prevailing taste. Sometimes series of little plaited strands like rats' tails are formed and hang around the head in a fringe; often solid plaits of hair about the size of a goat's horn are made to stand out from the head in different styles. Two of these will appear sprouting from the top of the head, or one will drop over the forehead and lie along the nose. Both men and women have their hair treated in the same way. The plaiting operation is also extended to the man's beard, the moustache and eye-brows are shaved off with an iron razor, which is a small cheese-cutter blade with a long slender handle. This is used somewhat as we hold a pen, and the stubbly hair is really chiselled off the face, no small amount of it being dragged out by the roots. A still more painful operation is the plucking out of the eye-lashes. Yet tribal disgust knows no bounds if this custom is not strictly adhered to. Often a native whilst speaking with me, has accompanied his remarks by forming a pair of nippers with the edge of his blade and his thumb and then deliberately pulling out his eyelashes, and when one eye was filled with water, and big tears rolled down his cheek then he attacked the other till the first was sufficiently recovered to admit of a renewal of the operation. This is of course a most idiotic custom in a land where the eye-lashes form such a splendid guard against the myriads of insects with which the air seems always to be charged. Yet the natives do not seem to feel any discomfort from getting anything in their eyes. They will take out the obstruction by pushing a pliant tiny stalk in between the eye and the lid, and scraping

round inside till the obstacle is removed. The natives of Lukolela have often told me that it was a mystery to them how I could hit even a buffalo with my sight obscured by eye-lashes.

Another item of the toilet is the treatment of the nails ; they must be cut close to the finger ends, and any one posing as beau or belle must have some of the nails entirely pared off exposing the quick.

All their efforts to improve their natural physique are unsightly disfigurements. Naturally they have beautiful regular teeth, but in that condition they do not appeal to the native taste. Some of the front teeth, often all of them, must be cut away into sharp points. The method of effecting this is the most nerve-shattering ordeal which Congo society suffers. The village blacksmith takes the patient's head between his knees, then with a small chisel-shaped instrument, and a block of wood as a mallet, roughly chips the teeth to the shape desired. The teeth thus rudely robbed of the protecting enamel, soon decay and break off, and the mouth studded with short blackened stumps is a most repulsive sight.

The natives are very conservative, and what their forefathers did before them they are quite content with now, no matter how painful or inconsistent the obligation may be.

Each tribe has a different way of cicatrising face and body. The Ba Bangi have rows of little gashes cut across temples and forehead. The Cannibal Bangala have a line of large pimple-like protuberances running right down the forehead to the extreme end of the nose, resembling a thread of large black beads. The Ngombé

people supplement this by carving the same ornamentation in a half circle from the bottom of the ear to the corner of the mouth. The Balolo succeed in disfiguring themselves more hideously than all the others. They raise large uneven bumps between the eyes and the cheeks and on the chin. These are cut in childhood and are repeatedly dug around and aggravated till the scarred bump is about the size and shape of half a walnut shell. Some of this tribe devote attention to the cultivation of bumps on the nose, and the result seems to suggest that the final effort was to have the extreme end of the organ adorned with a grotesque mound of scarred flesh. Castings of some of these faces would make effective masks for pantomime hobgoblins.

The sole attire of these natives is a small loin cloth neatly and artistically woven from the sinews of pine-apple leaf.

To be fully dressed these Central Africans must smear their bodies liberally with a paste composed of powdered red-wood (Ngula) and palm oil. This operation is a substitute for bathing and refreshing themselves.

When all the items of the toilet have been properly attended to, the popular idea of beauty does not depend on the result; the Mwasi Mompala (the pretty woman) according to the choice of one tribe is not at all the taste of another district. At Lukolela admiration was expressed for a long neck; she might squint and be bowlegged, but these defects counted as naught if she had a long neck (nkingu isanda). In another section of the land corpulency was the recognized form of beauty, and one tribe acknowledged only as a pretty woman her

of a very light color. The color of the natives varies very much, and ranges from a blue-black to a very light reddish-brown.

When I had been living amongst the natives some time, they felt sufficient interest in me to suggest that I should submit to some of the operations decreed by tribal habit. They were anxious that I should have my forehead and temples decorated with their national tattoo scars. They tried to persuade me to allow my hair to grow long and they would then plait it in designs like their own. They suggested that their village blacksmith should chip my teeth to sharp points, and expressed their disgust at my eye-lashes by calling me "misu-nkonge" (man of eye-lashes). Much as I wished to please my dusky friends, I failed to appreciate the charity of their wishes. They had not reflected that I hoped some day to return to my native land. It was, however, satisfactory and consoling to be told that if I would follow their customs, and then were a little blacker, I should be Mobali-Mompala, a good-looking fellow.

Amongst travellers the natives are hospitable, but their generosity is tempered by caution. If one man has a gourd of native wine he will not trust it in any one's hands; he will measure the allowance which he intends a friend to have. I have often given a man a spoonful of salt as a present; the recipient would not use this for cooking purposes, but would slowly consume it by occasionally dipping the end of his tongue into it. If a friend should ask for a taste of the luxury, he would not trust the stranger's tongue into the supply, but he would himself take a small pinch and place

it on the finger end, then invite the friend to take it with his tongue, at the same time he would cover the salt over with his hand.

I found that at Lukolela I was in the centre of a rich hunting country. The woods around my station and the vast swamp plains on the opposite shore were the feeding grounds of elephant, buffalo, hippopotami and antelopes.

Prowess in the hunting field at once obtains for the white traveller the respect and confidence of the natives. Not only do they admire the man who will risk the wild charge of a wounded bull or a rogue elephant, but they have an earnest appreciation for any influence which can furnish a meat supply. Owing to my success in the hunting field, I received the name of Makula, literally "arrows." They wished to call me *cartridges*, but they had not a native word, so they supplied a name the nearest they had to it. I obtained this proud title merely by a fluke. At the time of my first arrival at Lukolela, I knew but very little about a rifle. I foolishly imagined that I could fire and hit an animal in the head or heart or any other part of the body I decided upon, and then without further trouble I might have a broiled steak for the next meal! One day an excited villager rushed into my clearing and gasped out the news that a big buffalo had taken possession of his wife's plantation and threatened to destroy all her crops. My dusky friend implored me to go and kill the beast. At that time I was not acquainted with the hasty temperament and revengeful disposition of these animals, so I promptly accepted the invitation despite my inexperience. As I tramped off on my errand of

slaughter, a crowd of natives followed, and when we neared the place where the animal was supposed to be, all climbed into trees so as to see from safe quarters the interesting developments which might result from the competition between a Snyder rifle and an ill-tempered bull buffalo. Even the man who had invited me to this contest deserted me when we arrived in the vicinity of the game. In a few hurried whispers and some ingeniously suggestive signs, I was urged to believe that it was a great advantage to conduct such a venture alone. It was no time for argument, so I crept along stealthily through the long grass in the direction pointed out, and very soon I could see, just a little ahead of me, the shaggy old buffalo leisurely cropping off the tender leaves in a peanut patch. As I cautiously levelled my rifle above the grass the great brute, about thirty yards away, caught sight of me; he stretched out his neck and switched his tail in a very angry manner, and I at once lost confidence in my ability as a slayer of big game. My previous calculations with regard to this shooting question had not been carried on under such formidable conditions; however, my reputation was at stake, so with unsteady aim I pointed my rifle and fired for a spot behind the shoulder. The buffalo staggered for a few moments, then fell heavily to the ground dead. Upon examining the carcase, I found that my ball had entered the brain, two feet from the place I had aimed at! The natives were amazed at a single bullet killing a tough brute like a buffalo; not knowing the truth of my fluke shot, they attributed the animal's death to my clever shooting. And they decided to duly record the event by bestowing on me

the native name Makula, an envied title which the native hunter can only earn by attacking on foot elephant and hippopotamus with a spear blade; and I stole the reputation by a chance shot.

The natives living around my station were a light-hearted friendly people, and it required but a little tact and patience to preserve at all times friendly relations with them. Considering their wild environment, the Central Africans are wonderfully educated; they aim to acquire ability which will enable them to enjoy the benefits of their surroundings and will also aid them to battle with the perils and difficulties attending life in these regions.

The boys' favorite pastime is mimic warfare; sides are formed and they attack each other with blunted spears and wooden knives, and at a very early age become excellent marksmen. Such a training can be received none too early, for often when only 11 or 12 years old the young African fights to the death in defence of the village huts.

Every boy also becomes an expert swimmer and paddler, learns how to shape out iron weapons and wooden utensils, and by accompanying the parents on fishing and hunting expeditions, becomes thoroughly acquainted with the habits of the animal world and is instructed how to make and arrange nets and traps.

The Congo River teems with fine delicious fish and the woods everywhere are scarred by tracks of big game, principally elephants and buffaloes.

The young girls receive from their mothers instruction in the various domestic duties which they will in after life be called upon to perform.

When ten years old the Congo negress has her own little plantation to attend to, and she has learned how to properly cook the manioc, sweet potatoes and yams she has grown ; moreover she can toast to perfection a hippo or buffalo steak, knows each kind of insect and caterpillar that graces the Congo bill of fare.

By day they all define the hour by the position of the sun in the heavens, and they reckon the days by the moon's shape.

It is very difficult to impress upon the natives the vast extent of the white man's land (Mputu). They have seen so few white men, comparatively speaking, that they cannot realize our having a big country. Upon my asking them to draw in the sand the relative sizes of Mputu and their own little village, they would represent the latter by an immense circle several yards in diameter, but our country would be defined by a tiny ring a few inches in diameter.

Although the coast natives have been thoroughly demoralized by the introduction of strong liquor, its importation into the interior is sternly prohibited, and the natives on the Upper Congo have nothing stronger than *malafu* or palm wine, the milky sap of the palm tree. When fresh it is exceedingly refreshing and palatable, but in a day or two it becomes sour and is then intoxicating.

There is an animal on the Congo, which, from Paul du Chaillu's description of the gorilla, I should consider is the same animal ; by the Zanzibaris it is called *soko*, by the natives *esumbu*. It is brown-haired and large-eared with round face, smooth except the eyebrows and a scanty beard. This large monkey, if we are to be-

lieve the Congo negro, is descended from a man, who in ages past had drifted into debt and difficulty in his village and then fled to the woods to escape his creditors, and while waiting for his troubles to blow over, his limbs changed their shape and his body became covered with long hair. The women are much frightened of this animal, believing that he will carry away them and their children as captives if he has the opportunity. The actions of these animals are certainly very remarkable. I have heard a family of them making a peculiar noise like the rattle of drums, which is produced by beating on their chests. At times these sounds would cease, evidently at a given signal from the leader of their simian orchestra, then the air would be filled with shrill cries such as one hears from a large gathering of school children when school is dismissed.

The spirit of the Central African's religion is the dread of evil spirits. He believes that an unseen power is always present seeking opportunities to injure mankind. His superstitious mind attributes to this mysterious and malignant influence all reverses and disasters which he may suffer through life. When the crops fail the *moloki* or evil spirit is blamed for the misfortune; and if they fail to kill their game or win the battle it is credited to the same phantom maliciousness. Everywhere this antagonistic influence is lurking—in trees, in the stream, in the bodies of men, beasts, and birds, and reptiles the evil spirit is hiding, adopting the guise most convenient for the intent.

The African has no idea of gratitude for any beneficial surroundings. He feels that he has a right to life in a land where the forests are full of game, the

river teeming with fish, and the soil nourishing to perfection crops of fruit and vegetables. Life to him seems no free gift, but rather something to be dexterously snatched from the hand of adverse circumstances. Let him escape unhurt all the dangers incidental to his search for mere subsistence, and let him amass wealth, yet he cannot enjoy these benefits. Everything in earth and sky threatens his existence. He is always liable to an attack from savage beast and venomous reptile, to sickness and the slave raiders.

The imagination of the savage surrounds life with awe and mystery. He is continually in fear. Influences obnoxious to him lie concealed in every object. Trees, stones, herbs, all contain imprisoned spirits which, if released, may rend and destroy him. When he is least conscious of it he may be offending some spirit with power to work him ill. Sleeping, eating, drinking, canoeing, hunting, fishing, and fighting, he must be protected by ceremonies and observances from hostile influences, and he must be provided with charms for every season and occasion. The necessity for these safeguards has given rise to an elaborate system, and has created a mystical class called *nganga* or charm doctors. These individuals are the interpreters of the relations between man and the unseen powers. They dismiss evil spirits, furnish charms, and prescribe and regulate all ceremonial rites. A charm doctor can discover who it was that caused the old chief to sicken and die, or even who blighted the palm trees and dried up the sap; and, by his insight into the spirit world, he can discover the culprit, can interpret dreams, and predict the coming events.

XUM

The nganga or medicine man is always a conspicuous figure in a village. He wears a tall hat of animal skin, around his neck hang strings of specimens of his wares, and slung around his shoulders are little parcels of charms into which are stuck birds' feathers. Metal rings, to which mysterious little packages are attached, clash and clang as he walks, serving, together with a liberal assortment of iron bells, attached to his person, to announce his presence; and, as if the body did not offer a sufficient surface to display all his magical outfit, he carries, suspended from his left shoulder, in a large woven pocket, a load of wonder-working material, a curious assortment of preventives, eagles' claws and feathers, fish bones, antelope horns, leopard teeth, tails and heads of snakes, flint stones, hairs of the elephant's tail, perforated stones, different colored chalks, eccentric shaped roots, various herbs, etc. His idea in carrying around this property is that thus equipped he can administer some devil-proof mixture to suffering humanity.

The flight of the poisonous arrow, the rush of the maddened buffalo, or the venomous bite of the adder can be averted by the purchase of these charms, and the troubled waters of the Congo can be crossed in safety by the fisherman's frail craft. The Moloki, or evil spirit, ever ready to pounce upon humanity, is checked by the power of the Nganga, and halts at his whistle through an antelope's horn, or the waving of a bunch of feathers.

During the earlier part of my residence at Lukolela the natives supposed that I was one of the wonder-working individuals; my strange belongings, watch,

compass, rifle, revolver, field glasses suggested this idea which I did not deny, and on several occasions I was able to turn this to account. Once several large canoes put into my beach and the paddlers swarmed up to my hut to see me and hear me talk ; my vocabulary was a small one at that time, but I was ambitious and endeavored to explain to them all I knew of Europe, Asia and America. My audience was evidently very much entertained, and they decided to carry away a souvenir of the occasion by stealing my only saucepan. This utensil I was determined should be returned, so I called together some of the headmen, explained my loss and told them that if the saucepan was not returned by sun-down I wished them to come to my house and I would give them an exhibition of my mystic powers. The saucepan was not returned by the time stipulated, and the chiefs arrived. Previous to their arrival I had poured out a little brandy in a cup. When they were seated I gravely informed them that as the saucepan was not returned, I would give them an exhibition of my supernatural powers, and then I asked if any of them had ever seen water on fire. To which question they replied no, and said they did not believe water would burn. When I carelessly put fire to the brandy, they were aghast with astonishment. Now, I said, my saucepan must be returned by sunrise to-morrow ; if it is not, I will set the whole river on fire ! Fortunately I was spared the necessity of carrying out this dreadful threat.

To his religious functions the charm doctor unites those of surgeon and physician, and in this capacity displays considerable knowledge.

In the extraction of rude bullets, fired from old flint-locks, the Nganga displays great skill, although he always attributes such ability to the agency of his wonder-working charms.

The natives have a strange combination of characteristics; they are light-hearted, plucky, industrious and stanch friends, but still they are pitilessly cruel, and delight to witness human suffering and the spilling of human blood.

Horrible ceremonies result from the belief that death leads but to another life, to be continued under much the same conditions as the life they are now living. A chief thinks that if, when he enters into this new existence, he is accompanied by a sufficient following of slaves, he will be entitled to the same rank in the next world as he holds in this, and from this belief arises the hideous ceremony of slaughtering innocent slaves. Upon the death of a chief owning fifty slaves, twenty or twenty-five of these will be executed so that their spirits may accompany their dead master to the next world. The men are decapitated, the women strangled. When a woman is to be sacrificed she is adorned with bright metal bangles; her toilet is carefully attended to, her hair neatly parted, and she is draped with bright cotton cloth. Her hands are then pinioned behind and she is then suspended by the neck from a limb of a tree, and whilst the body swings in mid-air its convulsive movements are imitated with savage gusto by the spectators.

Upon the occasion of an execution all peaceful occupation is thrown aside, and old and young of both sexes give themselves up to the indulgence of the ghastly spectacle.

XUM

At early morn a peculiar slow beating on the wooden drums announces to the savage audience that an execution is about to take place.

The natives hurriedly leave their huts and very soon groups of men and women and children form themselves into circles, and excitedly perform dances, accompanied by boisterous singing, blasts from war-horns and drumming. When the slave is produced and preparations are made for his execution, he is at once surrounded by a brutal mob, which indulges in drunken mimicry of the contortions of face which the pain caused by the cruel torture forces him to show, and their frenzy increases till the climax is reached, when the executioner ends the poor wretch's misery by striking off his head.

One who has lived for some time in Central Africa comes to understand the little impression that acts of the most atrocious and wanton cruelty make on the savage mind. Surrounded from childhood by scenes of bloodshed and torture, their holidays and great ceremonies marked by massacres of slaves, the mildest and most sensitive native becomes brutalized and callous, and if this is so with the free, what must be the effect on the slave, torn when a child from its mother and doomed to privation and hardship even in its infancy?

Cannibalism and human sacrifices are attendant upon slavery. The man, who purchases another for a few fathoms of cloth or a few beads, buys him body and soul to do with just as he will. He will kill him to signalize the death of a freeman, or he may sell him for food to an Ubangi cannibal.

Even the declaration of peace demands the death of

a slave. Whilst up the Ubangi River, upon approaching the large settlement of Ndisi, I was horrified to see a corpse suspended by the heels from a bar lashed at the top of two tall poles. It had evidently been there about a week and was frightfully decomposed. Upon reaching a neighboring village we learned the reason of this sacrifice. Old Ndisi had been at war with a neighboring tribe for several years, and both parties had come to a peaceful understanding, and they decided to celebrate the event by hanging up a slave by the heels till he died.

There are two kinds of slavery in Africa, inter-tribal and that carried on by the Arabs. The latter is by far the most important.

The dimensions of slavery in Central Africa are increasing. The Arab man-hunter, fascinated by the rich profits from his slaves and ivory, does not retire from business; he buys more guns, hires more murderers and increases the sphere of his operations.

Vast armies of Zanzibaris and Manyuemas, officered by Arabs, are constantly engaged in the capture of the natives and the robbery of their ivory. The Arabs make no pretence to legitimate commerce; with their superior weapons and overwhelming numbers they can without difficulty overcome the poorly armed natives. Actually the slave traffic is subservient to the acquisition of ivory, for the Arabs capture the natives and then ransom them for ivory. Their plan of action is to stealthily surround a village by night, then at early dawn to fire off a few muskets to intimidate the villagers. Bewildered at the rude awakening, the poor creatures rush out of their huts and fall an easy prey

to the inhuman villains who leap into the village from all sides. All who resist are shot down or stabbed, and the remainder, old and young, are taken prisoners and are herded into a stockaded pen and there guarded night and day.

The Arabs then open up negotiations with the surrounding villages and exchange their captives for ivory. One big tusk weighing sixty-five pounds will grant the release of one slave. The Arabs remain in such a camp till the district is drained of its ivory, then the slaves who have not been ransomed are loaded down with ivory, and the merciless pillagers move along to a new hunting ground. The cunning Arabs purposely keep the native tribes at enmity amongst themselves by employing some as allies against a neighboring settlement. In the cannibal regions the payment for such service is meat, or to be more explicit, the dead bodies of those cruelly slain in the raids. The Arabs encourage the most brutal and barbarous customs among the interior tribes. Ceremonies involving human sacrifice and cannibal orgies create a demand for slaves, which the Arab will supply when the payment is ivory. The Arabs are not merely a few brigand bands scattered over the land, but a powerful, well-organized system of robbery and persecution, extending throughout the heart of Africa.

The slavers have several strongholds in Central Africa, the principal being Tabora, Karema, Kasongo, Nyangwé, and Stanley Falls. Large hordes of hired robbers branch out into all directions from these depôts and swarm over the whole land. They start out with their muskets and a few loads of ammunition, and re-

turn with slaves and ivory, obtained by theft and murder. The ivory eventually reaches Zanzibar on the east coast. Every tusk, already foully purchased by innocent lives, demands still more sacrifice before the delicate substance, daintily carved, graces some fair one's boudoir, where amidst its refined surroundings its bloody history is buried. It has been frequently said by travellers who have followed the trail of the slaver that so littered is the way with whitened skeleton and skull that these grim relics would guide you to the coast. It is a wonder that any of these carriers reach their destination. Given enough food only to keep life flickering in their emaciated bodies, covered with festering sores from the chafing slave fork and chain, goaded by the cruel lash from morning till night, they are driven along the trail, suffering all the indignities and persecutions which the devilish minds of their vicious masters can invent and carry out.

The occupation of Central Africa by the European powers must inevitably hasten the solution of the giant problem—how to suppress slavery? The Germans, British, French, Congo Free State have portioned out amongst themselves the whole of Equatorial Africa. Previous to this occupation it was the actual duty of no government to interfere in Central African politics; but now the European powers must establish law and order in their territories. The Arab slavers will not desist from their fiendish calling till compelled by force. The keys which they hold to a rich source of profit in Central Africa cannot be wrested from them without a fierce struggle.

The suppression of slavery is a monster undertaking,

but stern measures for its accomplishment are being carried out with grand deliberation. The Congo Free State, the Germans and the British, are all the time strengthening their forces and pushing on into the interior, contracting the Arab's sphere of operations into smaller limits. The Arab slavers, cut off from their supplies of ammunition from the coast and barred from northern support, must in a few years' time be crushed by the well-armed forces of civilization and its native allies.

No one has done more for Africa than Stanley ; his tiny trails are being worn into broad rows ; whole nations are following in his footsteps, determined to establish law and order at all cost. A noble chapter is being added to African history. A grand response is being given to the cry for justice from the helpless slave. The downfall of the Arab slaver is imminent, and the illumination of the Dark Continent is being heroically conducted.

MR. CARL LUMHOLTZ IN NORTHERN MEXICO.

The following letter was received August 22:

SIQUIRICHI, 16 July, 1893.

DEAR MR. H.:—

I hope you have, this year, received two letters from me, the last one of 29 May. I followed the Rio Fuerte down from Morelos to San Ignacio, making investigations among the very few surviving Tubares. I succeeded in getting a rather complete vocabulary of their language, including pronomina, verbs and phrases.

They bury their dead differently from their neighbors, the Tarahumares and Tepehuanes, in underground vaults or cavities. A few individuals, both male and female, were photographed and anthropometric measurements taken.

Nearly the whole Tarahumar land is drained by Rio Fuerte and its numerous tributaries, so, after having passed the pueblo Tubares, this river carries a great body of water. It is in the numerous *barrancas* watered by Fuerte and its branches that the gentile (pagan) Tarahumares live. In the dry season, from April to June, the gentiles make long excursions down the river to catch fish. The size of the river does not here allow any more of their usual method of fishing, by poisoning the water. They make a kind of fishing net by fastening together a dozen or more of their blankets, and on my travels down the river I saw some of my gentile friends catching in one hour quite a cartload of fish, mostly "suckers."

My road brought me over Rodeo once more to Batopilas where I, after over a year's absence from civilization, truly enjoyed four days civilized life in the hospitable house of Mr. A. R. Shepherd, director of the hacienda. The heat in Batopilas, as situated in a barranca, is very great, and the thermometer, every day of my stay here (first half of June), showed over 100° Fahr. in the shade, up to 106°.

From Batopilas I again ascended over 4,000 feet to the table land, travelling in a southerly direction for three days to Sta. Anita, where I remained over a fortnight. Nearly starved out from its dry, hot barrancas, I made my way to Gueguachic, from where I now am on my way back to Chihuahua and then to Chicago.

It will be refreshing both for soul and body to reach civilization again. I seldom get an opportunity to read as I don't get time to look at the few books I have. On account of my wandering life, mail but rarely reaches me. I am very fond of natives and of Mexicans, too, for all that, but, having this kind of people as sole companions for month after month, you long at last for something better.

Provisions are very scarce in the Sierra and, unless a man can live like the Indians themselves, he should not attempt to travel among them. I shall not trouble you by telling you how I fare; enough be it to say that, although I at present find myself among the most well-to-do Indians, it is extremely difficult to buy an *almud de maiz* (just enough for four men for one day.)

The gentiles have at present absolutely nothing to offer you but mezcal—the heart of the maguey toasted. Nevertheless, my health is good and I hope to return here in November to continue my journey into Guatemala, following the crest of the Sierra and making such investigations among the Indians as a year's time will allow me.

As the cave-dweller question now for over a year has occupied my attention very much, it may be appropriate to supplement what I before have stated on this subject. The Tarahumares are very fond of living in caves, but in most cases temporarily. Permanent cave-dwellers are not numerous, either among the so-called Christians or the gentiles. The Tarahumares generally plant corn on more than one place and have to move in order to save and to harvest, and also on account of their domestic animals for which they have to provide pasture according to the season. For this and other reasons a Tarahumar may change abode six times a year or more. In accordance with early training of the missionaries and constant admonitions of their present authorities, the Christian Tarahumares, as a rule, move in to the pueblos in the winter, but many, also, remain on their ranches or settle down in some cave. The gentiles have ranches on the mountain sides or on the tops of the barrancas (*cumbres*) but down in the barrancas they also plant corn at a later season, when the rains commence in June and July.

After having thus harvested his corn in the high localities, the gentile Tarahumar goes down to harvest in the barranca, where he almost invariably lives in caves. In May and June, when whatever little maize and beans he may have raised are gone, he wanders in the barrancas looking for fish and pitayas; and he may sleep in a cave or under a tree or wherever he finds it most convenient.

I have seen gentile Tarahumares have their caves close by, some 500 or 1,000 yards lower down towards the bottom of the valley. Here they like to live in the rainy months and in the winter; for the Tarahumar house, if he has one, is a miserable shed, covered with straw or the like. It is also a peculiar fact that, whether Christian or gentile, he does not sleep in his house. Husband and wife go at night to sleep under a tree, in a cave, or near the storehouse for maize, leaving the *to-cois* (boys) and *te-we-kes* (girls) to take care of the house.

Rarely do they make improvements in the caves, beyond building small peculiar round houses of stone and mud, as storerooms. They also make storerooms in remote caves. Other improvements in the caves are walls that do not reach to the top of the cave, mere partitions of stone and mud, or stone only; but they are rudely made and bear no comparison to what I have seen in the caves of the south-west of the United States.

The Tarahumares, moreover, do not live together in numbers; each family has its cave, and the caves are generally far apart. The pottery made by these people is rude and without decoration; but they show a marvellously developed artistic

sense in designing patterns for their girdles and blankets, which display very great variety and pretty combinations.

As already said, the Pimas to the north and the Tepehuanes to the south, the former particularly, share the Tarahumar predilection for caves.

These three tribes greatly resemble each other in appearance and mode of life, and yet with marked differences in some respects. The Tarahumares, for instance, take no account of puberty but marry a girl at any age, while it is considered among the Tepehuanes that a girl, who omits during the first three months a solemn purification, will bring disaster upon herself and upon others, almost as if the world were coming to an end.

Of the three tribes the Tarahumares being, to say the least, one of the most primitive races on the continent and among those least affected by civilization, remain much the most interesting. They are, also, strong in number. Without having had access to the official reports of the census, naturally not very exact with regard to Indians, I should estimate them at about 35,000, of whom 3,500 or 4,000 are gentiles. A Mexican gentleman, who has held the position of *Jefe político* and who takes a greater interest than any one else in these Indians, estimates their number at 100,000, about equally divided between Christians and gentiles. He, however, has not travelled among these people, and, while I claim for my own figures no more than an approximate value, I am convinced that his are absolutely wrong.

Yours very sincerely,
CARL LUMHOLTZ.

GEOGRAPHICAL NOTES.

BY

GEO. C. HURLBUT, *Librarian.*

CYCLONES IN AUGUST.—The Pilot Chart of the North Atlantic Ocean, for September, issued by the U. S. Hydrographic Office, shows the course of the four cyclones which traversed the ocean in the latter half of the month.

The first passed to the westward of Bermuda about 8 A.M. (Greenwich M. T.), August 16th, curved to the N. N. E., and was central at noon about 35° N. Latitude, 65° W. Longitude. At noon of August 17th it was central about 44° N. Latitude, 56° 30′ W. Longitude. Thence it continued to the N. N. E., crossed close to Cape Race and disappeared to the northward.

The second cyclone originated to the N. E. of Martinique, August 15th, passed S. of Santa Cruz on the 16th, and at noon of the 17th was central near the east end of Haiti. Through the night of the 16th–17th, it blew a hurricane at Puerto Rico. On the 18th at noon the centre was near Turk's Island, and at noon the next day about 60 miles N. E. of Cat Island. On the 20th, near N. Latitude 29°, W. Longitude 76°, the track curved to the northward and eastward and at noon, August 21st, the centre was about Latitude 37° 30′ N., Longitude

71° W. In the night of the 21st the cyclone crossed Nova Scotia, and on the 22d it passed over northern Newfoundland and thence to the N. E.

The third cyclone originated August 20th, N. E. of St. Thomas, and passed to the N. W. and then N. N. W. It reached Cape Hatteras at midnight of the 23d, and moved directly toward New York, where it was central at noon of August 24th. It did great damage on the coast.

The fourth was first reported, August 25th, N. E. of Crooked Island. It followed a northwestward course through the Bahamas and struck the American coast, in the night of August 27th, near Savannah, Georgia. This was the last intelligence received at Washington before the publication of the Chart; and it was only in the first week of September that the country learned with what fury the hurricane had swept the South Carolina coast. Towns and plantations have been destroyed; more than a thousand persons have perished, and between twenty and thirty thousand are left homeless and without means of subsistence. The Governor of South Carolina, under date of September 7th, has appealed to the people of the United States for help, and the following extract from an official report made to him by Dr. F. W. Babcock shows the urgency of the case:

COLUMBIA, S. C., September 7th, 1893.

His Excellency B. R. Tillman, Governor, Columbia, S. C.

SIR: As a result of investigations made at your request I submit the following report:

Three days were spent in making personal visits to the islands around Beaufort, and I there found the situation so serious as to demand immediate atttention.

All that portion of South Carolina known as the Sea Islands, and those parts of Colleton, Berkeley, Beaufort, and Charleston counties subjected to tidewater influences were more or less seriously damaged by the cyclone and high tide of Sun-

day, August 27th. The destruction of crops and homes was more especially noticeable on the exposed islands, which include Johns, Edisto, Port Royal, Wadmalaw, Coosaw, St. Helena, and the others adjacent. The territory adjoining Combahee, Ashepoo, and the neighboring rivers was found to have suffered serious losses.

At the lowest estimate fully 1000 lives were lost. The coroner of Beaufort places the number at 800. The storm swept away at least one-half of the homes on the islands facing the ocean, such as Coosaw, St. Helena and Edisto Islands. I may state that on Land's End, Pollywana and Hope plantations the survivors are crowded into the few houses that withstood the storm. These islands are inhabited by a population of about 45,000 people, most of whom are dependent upon their crops for support.

The plantations of that section have no right to expect more than an eighth of the ordinary crop. The people are to-day living on salted potatoes they have gathered, together with corn saved. This cannot last long. There are from 20,000 to 25,000 people who will have to be supported almost wholly until another crop can be planted, about April, when they can secure advances.

DR. NANSEN'S EXPEDITION.—The London *Times* of July 24th prints this telegram dated July 21st, from Berlevaag (mispelled *Berlevang* in Stieler's Atlas) on the north coast of Norway:

"We are leaving Vardö for Yugor Strait (between Waigatz Island, south of Nova Zembla, and the coast of Russia), where thirty sledge dogs will be waiting for us. We then proceed along the Siberian coast eastward past Cape Chelyuskin to the Olenets River, near the Lena, where another twenty-six dogs will be waiting for us. We then turn northwards, and hope to reach the west coast of the New Siberian Islands in the end of August if the ice is not bad. The latest information about the ice conditions in that quarter is favorable. We then proceed direct northwards until we get fast in the ice. If we meet with new land we shall follow along its west coast northwards. When there is no more open water we shall allow the Fram to drift with the ice. Everything has gone on well up to the present. The Fram is a splendid strong ship and will stand the ice-pressure well. She is deeply laden with coal, but that is a drawback which will soon be remedied. The accounts of the ice in the White Sea and the Barents Sea are not favorable. There has been much ice, but hope it has now improved; the ice changes quickly. I have good hopes; if we only get through the Kara Sea in good time I feel certain the prospects of success are good." FRIDTJOF NANSEN.

MR. PEARY'S EXPEDITION.—Mr. Peary's vessel, the *Falcon*, after taking in coal at St. John's, Newfoundland, on the 13th and 14th of July, steamed up the Labrador

coast and reached its destination in Greenland on the 3d of August. The voyage is described in the following letter, published in the New York *Sun*, of September 6th:

"FALCON HARBOR,
"HEAD OF BOWDOIN BAY,
"GREENLAND, August 20th, 1893.

"The Falcon arrived in this harbor on the 3d of August, after a successful though disagreeable voyage, owing to the constant succession of fog and rain. After leaving Battle Harbor, Labrador, stops were made at Hopedale and Okak, Moravian mission stations in Labrador, for dogs, twenty of which were obtained. The Falcon then bore away across Davis Strait to Holsteinborg, in southwest Greenland, where she arrived on the 26th of July. Nineteen dogs and a kayak (native man's boat) were obtained here, and after a stay of some five hours the Falcon steamed northward, reaching Godhavn, on Disco Island, on the 28th. Here twenty-one dogs, another kayak, and the fur clothing ordered last spring of the Danish Government were obtained, and after a stop of fifteen hours the ship again headed northward, arriving at Upernavik two days later.

"Only a few dogs being obtainable here a stop of only three hours was made, and, with a native pilot on board, the ship steamed to Tasuisak, about forty miles further north, the most northern white settlement on the face of the globe. Here seventeen dogs were obtained, making a grand total of eighty-four.

"The stay here was only long enough to put the dogs on board and, eight hours later, the Falcon was at Duck Islands on the southern edge of Melville Bay. Five or six hours were spent here in the effort to get a supply of ducks, but the lateness of the season and the previous visit of five whalers had so diminished the ducks and made them so wild that the effort was unsuccessful.

"Leaving the Duck Islands at 4:40 P.M. on July 31st, the Falcon steamed past the point of Cape York at 5:30 P.M. on August 1st, having made the run from Duck Islands to Cape York in twenty-four hours and fifty minutes, the quickest passage on record through Melville Bay.

"The native settlement at Cape York was visited in order to make inquiries in regard to Mr. Verhoeff [the member of Peary's last expedition, who is believed to have perished in a crevasse], but no tidings could be obtained, though I found there one of the Eskimos who had been living with me at Red Cliffe House, and who was there when the Kite left for the south in August last year, and who had been with me in the search for Verhoeff.

"Steaming northward an effort was made to find natives on Saunders Island and at North Star Bay, but without success. At Netchiloome, just at the entrance to Whale Sound, two native families were found, old acquaintances who had visited Red Cliffe House. They had neither seen nor heard anything of Verhoeff. Both these families, with all their belongings and about a ton of narwhal and walrus meat for the dogs, were taken on board and brought to the site selected for the new house, a site which I noticed a year ago as being particularly suitable for our purpose.

"The location is at the head of a little rock-bound harbor, which is itself at the head of Bowdoin Bay, and is perfectly protected from wind and storm, and gives easy access to the Inland ice. After landing the material and getting the house well started, with a few members of my party on board, we steamed to the walrus ground in Whale Sound, where twenty-four were captured in one evening, and then to the eider duck and walrus haunts in the neigbborhood of Littleton Island. Here, however, only five walrus and a few ducks were obtained on account of the weather. A look was taken along the ice from Cairn Point to Cape Isabella, and so far it has been undisturbed this season.

"We then visited the site of Polaris house and obtained a number of relics. We then steamed up to the bird cliffs of Hakluyt Island with the intention of obtaining birds, but a stiff southwester made this impracticable, and the ship was run into Uhlrich's Bay for reindeer. Seventeen of these were brought in in one night's hunt, and the meat and skins and the walrus were brought to the site of the house.

"All the members of the party are in the best of health and spirits, and, with the eighty-four dogs, some twenty tons of dog feed, and a dozen or more reindeer for the meat supply of the party, the prospects are extremely encouraging. It is expected that the next month's hunting will add at least fifty if not seventy-five deer to our stock, as I shall have about me in a few days six of the most trustworthy hunters of the tribe, to whom will be furnished repeating Winchesters for hunting.

"R. E. PEARY,
"Civil Engineer, U. S. N., Commanding Expedition."

Additional details are given in the following extract from a letter dated Falcon Harbour, Bowdoin Bay, Greenland, August 11, 1893, to Ex-Chief Justice Charles P. Daly, President of the American Geographical Society:

. . . "As you have doubtless learned from the press and perhaps other sources, the result of a happy suggestion that I should place my ship on exhibition at two or three of the principal cities has been to give me the funds which were still lacking to fit out my expedition properly. I feel that I have been extremely fortunate, and believe that I am justified in a certain amount of pardonable pride in that I have succeeded, in the short space of nine months, after returning from one expedition, in fitting out and starting upon a second. I have also been extremely fortunate thus far in the prosecution of my work. I landed here with eighty-four dogs, obtained at various points along the Labrador and Greenland coasts. We were scarcely troubled at all by the ice during our northern voyage. We have made the passage of Melville Bay, from the Duck Islands to Cape York, in nearly a direct line and in what I believe to be the shortest time on record—24 hours and 50 minutes. We have had the calmest weather since passing the Duck Islands, and I have here a perfect harbor for my ship and a perfect site for my house,

which is to be our Arctic home. I believe that the world is in sympathy with the work, and I feel that fortune will smile upon my efforts.

"Mrs. Peary joins me in best regards to you and Mrs. Daly.

"Very sincerely,

"R. E. PEARY."

Mr. Peary expects to accomplish his purpose within a year and to return with his party in the *Falcon*, in the autumn of 1894.

An unfounded and possibly malicious despatch, sent to the public press from St. Johns, Newfoundland, on the return of the *Falcon* from Greenland, gave a discouraging account of Mr. Peary's prospects. It was said that his expedition would probably be a failure, that some of his party had openly expressed their discontent, that the burros (asses) were all dead, and that Mr. Peary would not be able to provide himself with dogs, because he was not willing to pay more than a tenth part of their value.

These absurdities, or some of them, found their way to Germany, where they received unexpected hospitality and appeared as authentic news in *Petermanns Mitteilungen* (39 Band, VIII.), under the respectable name of Dr. H. Wichmann.

WOMEN MAY NOT BE FELLOWS.—At the anniversary meeting of the Royal Geographical Society, held in May last, it was settled that the question of the admission of women to membership should be submitted to the Fellows.

Voting cards were prepared and sent by post to the 3500 Fellows. Answers were returned by 1735, as follows: 1169 voted "Yes," without qualification, and 55 "Yes," subject to qualification; 466 voted "No," and 45 "No," subject to qualification.

This vote did not decide the question. A special general meeting of the Society was held on the 3d of July, at the London University, to dispose of the matter. Speeches were made pro and con, and the Hon. G. Curzon, M.P., distinguished himself by the warmth, if not by the reasonableness, of his opposition to the proposed change.

He said that ladies were out of place in scientific societies, such as the Geographical, and that the admission of women to the Anthropological Society had quite spoilt it for scientific purposes. The change was part of the general movement to break down the natural barriers between the two sexes. The steps towards the so-called emancipation of women would be not so much injurious to men as disastrous to women. The rooms of the Society were much too small to be subjected to the overcrowding of ladies. Ladies constantly formed a large proportion of the audience at their meetings, and exercised an influence—to which he had himself succumbed—over the lecturer himself. The strongest argument, however, was the scientific character of the Society, membership of which carried great weight. Men traded on the initials, "F.R.G.S.," when they were abroad, and he earnestly hoped women would not do the like.

There must have been a great number of ladies present when Mr. Curzon made these remarks.

After further discussion the question was put, with the following result: For the resolution admitting women to ordinary Fellowship, 158; against it, 172.

Did Vespucci Make a Voyage in 1506?—A passage

from a despatch sent by Leonardo da Ca' Masser to the Venetian Senate from Lisbon, April 16, 1506, reads: "There are letters come from Cadiz which say that, on the 1st of March, four ships belonging to the most serene King of Castile set sail for India, towards Malacca, under the command of the Florentine, Francesco Amerigo." *

On this passage Prof. Luigi Hugues, in the *Bollettino* of the Italian Geographical Society, Serie III., Vol. vi., Fasc. v., bases an interesting argument.

He does not doubt that the Amerigo referred to is Vespucci, though the name Francesco was never borne by him. The Spanish documents, while they partly enable us to follow Vespucci for the period from 1505 to 1508, are silent with regard to him from June 5th, 1505, to the end of August, 1506, and from September, 1506, to January, 1508. It is therefore quite admissible that, between the 1st of March and the end of August, 1506, he may have performed the voyage mentioned by Leonardo Masser, for which six months would have afforded full time. It was, moreover, in the same year that Vicente Pinzon and Juan Diaz de Solis made their expedition to discover, to the westward of Cuba, the supposed strait which would open a way to Asia. There is no difficulty in admitting their return from the expedition in the interval from March 1st to August, since, in a letter to the Casa de Contratacion, under date of August 23d,† Philip the First ordered that Pinzon and Vespucci should be asked whether the ships

* Published in the Raccolta di Documenti e Studi pel Quarto Centenario dalla Scoperta dell' America, Parte III.—Volume 1, p. 92.

† Philip died, September 25th, 1506.

intended for the discovery of the Spice Countries would be made ready before the winter; and the two navigators must therefore have been in Spain at that time.

Pinzon and Solis had not succeeded in their search for the strait; and there is nothing improbable in the conjecture that it was now determined to seek the solution of the problem under more southern latitudes, and especially along the coast of Brazil, which had been explored for a considerable distance by the Portuguese expeditions of 1501 and 1503, in both of which Vespucci had taken a most active part: and, in fact, these same explorers, only two years after their Central American expedition, made a voyage along the South American coast as far as 40° South Latitude, but without discovering the mouth of the mighty Rio de la Plata.

Prof. Hugues thinks that the names of the two capes, *C. Sancti Marci* and *C. Doffin de Abril*,* in Ruysch's map of 1508, are to be referred to the voyage of 1506, and that the inscription, "*Up to this point came the ships of Ferdinand, King of Spain*,"† alludes to the same expedition.

Navarrete, after mentioning the voyage of 1506, says that the King, on his return from Naples, summoned to the Court Solis, Pinzon, La Cosa and Vespucci, in order to confer with them on the subject of further explorations towards the south and along the Brazilian coast and this seems to show that La Cosa and Vespucci had taken part in the enterprise of 1506, possibly as captains of two of the ships.

The object of the expedition—the discovery of a

* The exact form is C. De Fundabril.

† Huc usque naves Ferdinandi Regis Hispaniæ pervenerunt.

passage to the East Indies—agrees, also, with Masser's statement that Amerigo intended to reach Malacca.

FOREIGN GEOGRAPHICAL NAMES.—Prof. Dr. E. Richter, in *Petermanns Mitteilungen, Bd.* 39, v., quotes in order to correct a Hungarian writer, Mr. von Déchy, who asserts that the name of the river Theiss should always be given in its true Hungarian form, *Tisza.*

Dr. Richter maintains that the river is properly called *Theiss* by the Germans, to whom Venezia is known as *Venedig*, Napoli as *Neapel*, and Milano as *Mailand*, according to the principle adopted by every European people in spelling and pronouncing foreign names of frequent occurrence. This principle, it is held, applies with peculiar force to Hungary, on ethnographical as well as on historical grounds.

The argument does not seem to cover the whole ground. London, Paris, Madrid, Marseille, Edinburgh, Le Havre, Liverpool, Porto, are some of the names which suffer no change in Germany. The *Theiss* and the *Themse* are German forms, but the Mersey and the Tweed, the Seine and the Loire, the Tajo and the Minho keep their foreign shape. The difficulties of pronunciation can have had but little to do with producing the existing modifications. Milano is as easy for a German as for an Italian tongue, and Neapel is no improvement on Napoli.

Whatever its origin may have been, a form once established is able to hold its own against the strongest proof that it ought not to be.

APIAN'S THIRD MAP OF THE WORLD (1530) AND THE

MAP OF 1551 FALSELY ASCRIBED TO HIM.*—Prof. Dr. Hermann Wagner contributes to the *Nachrichten* of the Göttingen Academy of Sciences, No. 16, for 1892, a preliminary communication on the cartography of Apianus, and especially on the two maps named in the title.

Prof. Wagner gives, from Harrisse's *The Discovery of North America, Paris*, 1892, the following list of maps ascribed to Apianus:

1. 1520, Vienna, The Tipus orbis universalis.

2. Ante 1522, to accompany the "Declaratio, etc." (lost).

[3. 1522, Small planisphere inserted in the work just mentioned.]

[4. 1524, Two diminutive maps in the "Cosmographicus liber."]

5. Circa 1524, Described in the "Isagoge" (lost).

6. 1530, Ingolstadt. From his own private press.

7. 1530, Antwerp. Printed by Peter de Vales de Guldenhant.

[8. A MS. mappa mundi made for Charles V., formerly preserved in the Escurial (lost).]

Though Prof. Wagner hopes that traces may yet be found of the lost map of 1522, and perhaps, also, of other maps of Apian's, he recognizes only three maps of the world as genuine works of that cosmographer These are:

Typus orbis universalis, of 1520, Vienna.

Mappa mundi, of 1522, Vienna or Ratisbon?

Tabula orbis cogniti universalior, of 1530, Ingolstadt.

* Die dritte Weltkarte Peter Apians v. J. 1530 und die Pseudo-Apianische Weltkarte von 1551, Vorläufige Mitteilung von Hermann Wagner.

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The *Charta Cosmographica*, of 1544 (1551), must be rejected as not genuine. It is to be assigned to Gemma Frisius. The small maps of the *Declaratio* and the *Cosmographicus liber* do not call for further notice, and nothing is known with regard to the MS. map said to have been drawn by Apianus for Charles V. The passage in Cl. Clemens, to which Harrisse refers, speaks as plainly as possible of an *instrument*, and not of a map:

"There is one (instrument), presented by its maker, Peter Apianus, to the Emperor Charles V., convenient for ascertaining the sites, elevations, distances and extent of places; and to explain its use he wrote four great books, some of which have been published, and some, still in MS., are kept here with the instrument itself." *

The *Typus orbis universalis* owes its preservation to the fact that it was published in two works, the Camers edition of Solinus, 1520, and the Vadianus Pomponius Mela, 1522.

The *Mappa Mundi* of 1522 is lost. Prof. Wagner thinks it may yet be found, bearing the name of its maker, "for Apianus did not hide his light under a bushel, but marked his productions with his name and title and origin." There exists but one anonymous writing of his: the *Cosmographiae Introductio.*

The Universalior cogniti orbis Tabula of 1530 is now in the map room of the British Museum. Prof.

* Est unum (sc. instrumentum) a P. Ap. ejus auctore oblatum Carolo V. Imp., locorum sitibus, altitudinibus, distantiis et amplitudinibus explorandis commodum; ejus usui cognoscendo quatuor grandes tomos scripsit, quorum alii editi sunt in lucem, alii MSti (sc. tomi !) cum eodem instrumento hic asservantur.

Wagner gives a somewhat detailed description of this, which he calls the "third and best map of the world by Apianus," and promises to issue a copy of it with his more elaborate paper. It is on the cordiform projection. Twelve pages are devoted to an examination of the *Pseudo-Apianische Weltkarte* of 1551. The results arrived at are :

1. That Peter Apianus is in no sense the author of the *Charta Cosmographica.*

2. That this is to be assigned, not to the year 1551, but to 1544.

3. That a series of facts brings it into such close relation with Gemma Frisius that the map may be declared to be his work.

THE INLAND ICE OF EASTERN GREENLAND.—Mr. Hansen-Blangsted reports, in the *Revue de Géographie* for September, p. 230, that Lieut. Garde, of the Danish navy, has just completed an exploration of the Inland ice from the eastern side. The starting-point was the glacier of Sermilsialik in 61° N. Lat.

The distance travelled was 300 kilometres (186 miles) and the time occupied thirteen days.

The journeys were made by night, which was found to be a better time for marching over the ice.

The highest elevation was 7,000 feet, and Lieut. Garde's experience, like Mr. Peary's, showed that the glaciers along the coast offered greater difficulties than those of the interior.

Mr. Hansen-Blangsted gives expression to the patriotic hope that the Danish explorers of Greenland will not allow themselves to be anticipated by men of other nations.

JACKSON'S POLAR EXPLORATION.—Mr. F. G. Jackson left England in July for Novaia Zemlia, where he means to pass the coming winter in order to familiarize himself with arctic life and to practise the management of the sledges which he has constructed. It is his purpose to make his start for the Pole in the spring, by way of Franz Josef Land.

THE BAR OF CHARLESTON HARBOUR.—*The News and Courier*, of September 11, reviews the work done during the past year in deepening the channel across the bar at Charleston, South Carolina.

Two stone jetties have been raised to a height of from 8 to 12 feet above low water. The material used was: for the north jetty, 187,994 tons and 112,335 cubic yards of stone and 175,155 square yards of mattress; for the south jetty, 217,586 tons and 143,414 cubic yards of stone and 306,585 square yards of mattress. The dredging has amounted to 616,192 cubic yards. The results achieved are: a good 15-foot channel between the jetties all the way through at mean low tide (the tide rises six feet at Charleston) from deep water outside to deep water inside, perfectly straight and of sufficient width to be safely navigated. For a great part of the way a much greater depth has been obtained. Except for a stretch of about 2000 feet outside of the large red buoy and of another stretch of about 800 feet at the extreme outer end there are now 18 feet at mean low tide. For a distance of about one-half a mile, just where old Swash Reef used to be, with least depth of from 7 to 8 feet, there are now 21 feet or more at low water.

The jetties are capable not only of maintaining the dredged channel, but of producing enormous scour without the aid of a dredge. Over 1,000,000 cubic yards of sand have disappeared from the area between the jetties and between their axes prolonged, since 1884, of which 500,000 have passed out in the last twelve months.

The Light House Board has lighted the new channel by placing a brilliant back range high up in St. Philip's steeple, and now vessels can enter at night as well as by day by bringing Sumter light in range with St. Philip's light.

THE DISMAL SWAMP.—The Tenth Annual Report of the U. S. Geological Survey contains a paper by Prof. N. S. Shaler on the Fresh-Water Morasses of the United States, with a Description of the Dismal Swamp District of Virginia and North Carolina.

Inundated lands are divided according to their physical character into marine marshes and fresh-water swamps. The marshes are subdivided into those above mean tide—grass marshes and mangrove marshes—and those below mean tide—mud banks and eel-grass areas.

There are four subdivisions of fresh-water swamps: river swamps, divided into terrace and estuarine; lake swamps, divided into lake margins and quaking bogs; upland swamps, divided into wet woods and climbing bogs; and ablation swamps.

Prof. Shaler estimates the total area of reclaimable inundated lands in the territory of the United States, east of the Rocky Mountains, at between 105,210 and 131,200 square miles. Florida has about 30,000 square

miles, or half the area of the State; Louisiana comes next with about 15,000, the area of the State being 48,720 square miles; Mississippi and Arkansas have each about 10,000; and Michigan, the next in order, has between 6000 and 9000 square miles. These are approximate figures, based on the study of the existing maps. For the region between the Rocky Mountains and the Pacific, Prof. Shaler is disposed to think that the total area of soil which may be won from inundation by ordinary engineering devices does not exceed 10,000 square miles.

The Dismal Swamp covers about 1500 square miles in Eastern Virginia and North Carolina. Originally it was perhaps one-third greater than its present size. The Dismal Swamp canal, constructed in the last century, runs at right angles to the slope of the country and interferes with the natural drainage, the dike on the west retaining the waters in that region, so that the western section of the swamp is probably wetter than it was before the construction of the barrier, and the eastern section has become partially desiccated. Many places east of the canal might be tilled in an ordinary summer season without inconvenience from water.

About the centre of the western section is Lake Drummond, a shallow body of water, 18 or 20 miles in circumference. The local tradition is that the basin of this lake was formed by forest fires. Prof. Shaler regards it, on the contrary, as one of the peat-enclosed lakes, so common in the small morasses of the glaciated era.

The vegetation of the Dismal Swamp exhibits considerable diversity. The higher land, lying not more

than three feet above the lowest adjacent levels, is occupied by a growth of the common Southern pines. The trees in the lower levels are of three species, all tolerant of water about their roots: the Taxodium or bald cypress, the juniper and the black gum (Nyssa uniflora). The juniper grows on ground which is somewhat desiccated during the dry season; the gum and the cypress can inhabit areas which are water-covered even during the growing season; and it appears that the knees of the cypress develop only where the roots upon which they rest lie beneath the surface of the water at this time. The tallest knees seen in the Dismal Swamp are elevated not more than three feet above the roots, while those of the Mississippi Valley swamps attain twice that height.

The western border of the swamp is well-defined by a sharp elevation or escarpment, clearly an ancient sea-margin, traceable from a point north of Suffolk to the southern border of the morass. with a general trend north and south. The average difference of height between the base and the summit plain is about 20 feet; and, although its surface is more or less eroded by stream action, it is on the whole better and more continuously manifested than in any other marine bench which Prof. Shaler has seen in this country or in Europe.

The animal life of the Dismal Swamp is not of many kinds. The birds that build on the ground are generally absent, and the rodents are unknown. Bears are numerous, and two hundred are killed every year. Deer have become scarce, but there are many wild cattle, described as generally black and of small size, but

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fierce and dangerous to the hunter. They feed on the tender shoots of the cane, and range in herds of from twenty to fifty. Individuals are sometimes led by offerings of salt to join the domestic herds, but it is evident that the wild cattle live entirely without salt, since the tidal rivers which penetrate to the swamp are all fresh and there are neither springs nor licks like those to which the buffalo resorted in the Mississippi Valley.

The whole of the Dismal Swamp area, with the exception of small strips near the mouths of the inlets from Albemarle Sound, may, in Prof. Shaler's opinion, be won to tillage. All the important parts of the swamp system lie well above tide-water, and the average inclination of the surface is about twenty inches per mile. The value of the land, if reclaimed and cultivated, is estimated at a very high but not unreasonable figure, considering the known fertility of the soil and the ease of access to great markets.

The district cannot be called unhealthy. A certain amount of malarial fever occurs around the margins, where the summer heat dries out a portion of the swamp area; but the central portions of the morasses at the distance of a mile from the margin seem to be fairly exempt, and the people in the interior of the swamp are less affected by fevers than those who live on the ordinary upland surface of Virginia and North Carolina.

The Lake Mistassini Region.—Early in September the Department of Crown Lands for the Province of Quebec sent out a party to begin a thorough survey of

the country north of Lake St. John. Work will be prosecuted for about three months and then discontinued until the spring of 1894, when it will be resumed and carried on till late in the autumn. The plan is to complete the survey in three years, and to acquire definite knowledge, once for all, of a practically unexplored district.

THE SWISS LAKES.—*Petermanns Mitteilungen, Bd.* 39, *No.* v, prints a table by Prof. J. J. Egli, giving the area and the depth of forty-two Swiss lakes. The areas are in square kilometres, the depths in metres.

	AREA		DEPTH	
	Sq. Km.	Sq. M.	Metres	Feet
Aegeri	7	2.70	83	272
Baldegg	5.04	1.97	66	217
Bienne	42.16	16.28	78	256
Brienz	29.95	11.56	261	856
Constance*	539.14	208.17	255	837
Geneva	577.84	223.11	310	1017
Greifen	8.44	3.26	34	112
Hallwyl	10.37	4.00	48	157
Joux	9.30	3.59	34	112
Lowerz	2.84	1.10	13	43
Lucerne	113.36	43.77	214	702
Lugano	50.46	19.49	288	945
Maggiore†	214.27	82.73	365	1198
Morat	27.42	10.59	49	161
Neuchâtel	239.62	92.52	153	502
Pfäffikon	3.10	1.19	36	118

* Including the Unter See.

† Prof. Egli admits a possible greater depth south of Luino, at which point the Swiss soundings cease.

	Area		Depth	
	Sq. Km.	Sq. M.	Metres	Feet
Poschiavo	1.60	.62	84	276
St. Moriz	3.15	1.22	44	144
Sarnen	7.40	2.86	52	171
Sempach	14.28	5.52	87	285
Sils	4.00	1.54	71	233
Silva Plana	2.86	1.11	77	253
Thun	47.92	18.50	217	712
Walen	23.27	8.99	151	495
Zug	38.48	14.86	198	650
Zurich*	87.78	33.90	143	469

Sixteen of the forty-two lakes have areas of less than half a square mile. These are:

	Area	Depth
	Sq. Km.	Metres
Bianco	.82	47
des Brenets	.57	32
Burgäschi	.23	31
Campfer	.54	34
Davos	.55	54
Klön	1.18	33
Lungern	.86	33
Märjelen	.41	47
Mauen	.57	9
Moosseedorf	.31	22
Nero	.08	12
Oeschinen	1.14	63
Seelisberg	.18	37
Soppen	.24	28
de Taney	.17	31
Türl	.49	22

* Including the Obersee.

In the last edition of the *Encyclopædia Brit.*, Vol. XXII., p. 777, Hallwyl is credited, doubtfully, with a depth of 1522.8 feet, and the approximate depth of the Lake of Zug is put at 1321 feet.

THE CORINTH CANAL.—The opening of the canal across the Isthmus of Corinth took place on the 6th of August, in the presence of the royal family, the ministers and the diplomatic body. The king, in his discourse, gave the credit of the enterprise to the minister Zaïmis, who conceived it, and General Türr, who directed it from the beginning to the end.

The queen then cut, with a pair of gilded scissors, the white silk ribbons, which had been stretched across the canal, and the *Sphakteria* (surely, a name of ill omen!), with the royal family on board, passed in, followed by a torpedo flotilla, a Russian war-ship, four English ships, and a great number of steamers and other vessels.

The canal is just 4 miles long, 26 feet deep and 72 feet in width, and it is cut through almost solid rock, rising at the highest point to 200 feet above the sea. At the western entrance stands the town of Poseidonia and at the eastern Isthmia, near the place made famous by the celebration of the Isthmian games.

THE DEATH OF EMIN PASHA.—The following account appeared in the London *Times* of September 5th: "All doubt concerning the death of Emin Pasha now seems to be removed by the circumstantial account of his murder given to Mr. A. J. Swann. This gentleman, who for ten years, has been working on the London

Missionary Society's staff on Lake Tanganyika in Ujiji, has just reached London, accompanied by his wife, the only European lady who has ever visited that country. Speaking of Emin Pasha's death to a representative of Reuter's Agency, Mr. Swann said :—"

"As to the death of Emin there is no question; in the interior it is accepted as a fact, but some uncertainty prevails on the subject at the coast. Personally I am as certain that Emin is a dead man as I am that I am sitting here. The report of his death came to me at Ujiji in consequence of a letter which had been received there asking what should be done with Emin's effects. I at once made inquiries, and was told that he had been killed in the Manyema country by Seyd Bin Abed, and that his following of thirty Nubian soldiers had been killed and eaten. This report, which was of a most circumstantial character, reached me from four different sources in Ujiji, and to my mind is as conclusive as anything can be in Africa. It is implicitly believed by all the Arabs, who seem very well pleased to have at last got rid of Emin.

"One of my informants was an Arab who had been travelling on Emin's route. This Arab not only described Emin's journey, but, although he had probably never seen a map in his life, sketched on a piece of paper the various places touched by the explorer, and described how he had been tracked by the Arabs, who had made up their minds to kill him. Emin passed through Ruanda country and had followed one of the rivers flowing into the Congo until he came to Seyd Bin Abed's residence, where he stopped. Shortly after his arrival a number of Arabs went out and asked Emin where he was going. Emin replied, 'I am going to the coast.' Another Arab then went forward and said, 'You are Emin Pasha, who killed the Arabs at the Victoria Nyanza. I will kill you.' He then took a large curved Arab knife from his belt and, brandishing it aloft, struck off Emin's head. His body was then thrown to the Manyema, who devoured it, the Nubian followers being afterwards also killed and eaten.

"In estimating the credibility of this report," said Mr. Swann, "it must be remembered that Ujiji is the nearest spot to that where Emin had last been heard of. So much impressed was I with the account that I ordered Rumaliza to get any papers or letters left by Emin, and he promised to do so. The greatest uncertainty is felt on the subject at the coast, but the fact that Emin has never been seen or heard of since he reached Ruanda speaks volumes."

In a letter to the *Times* of September 6th, Mr. Swann corrects one error, and is made the victim of another. He did not say that Mrs. Swann was the only European lady who had ever entered Ujiji, but that she was the only one who had travelled overland from Zanzibar to

Ujiji and thence across the plateau to Lake Nyassa and the *Zanzibar* River. Mr. Swann undoubtedly wrote *Zambezi*, but the *Times* has its own geography.

RUINED TEMPLES IN MASHONALAND.—Mr. R. M. W. Swann writes to the *Geographical Journal* for September, 1893, p. 263:

"I have examined two ruined temples of the Zimbabwe period and style, situated at the confluence of the Lotsani and Limpopo Rivers in S. Latitude 22° 39′ 42″, E. Longitude 28° 16′ 30″. The temples show the same system of orientation and geometrical construction as the great temple at Zimbabwe. I cleared the bush from the more perfect of the two temples on the Lotsani, and made a careful measurement of many of the radii of the one curve of which it consists. I oriented directly from the centre of the curve and saw the sun from that point setting just to the left of the middle of the main doorway. On correcting the position of the sun for its decrease in declination during the seventeen days which had elapsed since the solstice, I found that it would set at the solstice exactly in a line with the centre of the arc and the middle of the doorway. This direct measurement and observation should remove any doubt as to the applicability of our theory of the construction of the plans of these temples."

GEOGRAPHY AT THE MEETING OF THE BRITISH ASSOCIATION.—The British Association for the Advancement of Science met at Nottingham, September 13. Sir Archibald Geikie, the retiring President, formally introduced his successor, Dr. Burdon Sanderson, whose address was on the subject of Biology, the origin and first use of the term, and the relations between that and other branches of natural science.

The London *Times* reports at length the address of Mr. Henry Seebohm, Sec. R.G.S., F.L.S., F.Z.S., who presided over the Section of Geography.

He chose for his subject the Polar Basin, of which he said that "the relative distribution of land and water and the geographical distribution of light and heat in

the Arctic region is absolutely unique. In no other part of the world is a similar climate to be found."

He estimated the unexplored regions of the Basin at 1,000,000 square miles and briefly reviewed the work of exploration already accomplished by Peary and Nansen, and gave a sketch of the enterprises in which they are now engaged. Nansen hopes that the current which carried the Jeannette from Herald Island, north of Behring Strait, in a north-westerly direction for 500 or 600 miles is the same current that flows down the east coast of Greenland, and he bases his hopes upon three facts. First, that many articles from the wreck of the Jeannette were found on an ice floe off the South coast of Greenland three years afterwards; secondly, that a harpoon-thrower of a pattern unknown except in Alaska was picked up on the south-west coast of Greenland; and thirdly, that drift-wood supposed to be of Siberian origin is stranded regularly in considerable quantity on the coasts of Greenland. The Norwegian at Hammerfest, about latitude 70 deg., is dependent for his firewood upon the Gulf Stream, which brings him an ample supply from the Gulf of Mexico, whilst the Eskimo, on the Greenland coast, in the same latitude, trusts to a current from the opposite direction to bring him his necessary store of wood from the Siberian forests.

By no means the least important physical feature of the Polar Basin is its gigantic river systems. The rivers which flow into the Arctic Ocean are some of them amongst the greatest in the world. Some idea of the relative sizes of the drainage areas of a few of the best known rivers may be learnt from the following, in which the Thames, with a drainage area of 6,000 square miles, is the unit:—9 Thames equal 1 Elbe (54,000); 2 Elbes equal 1 Pechora (108,000); 2½ Pechoras equal 1 Danube (270,000); 2 Danubes equal 1 Mackenzie (540,000); 2 Mackenzies equal 1 Yenisei (1,080,000); 2 Yeniseis equal 1 Amazon (2,160,000). There is nothing that makes a greater impression upon the Arctic traveller than the enormous width of the rivers. The Pechora is only a river of the fifth magnitude, but it is more than a mile wide for several hundred miles of its course. The Yenisei is more than three miles wide for at least a thousand miles and a mile wide for nearly another thousand. Whymper describes the Yukon as varying from one to four miles in width for three or four hundred miles of its length. The Mackenzie is described as averaging a mile in width for more than a thousand miles, with occasional expansions for long distances to twice that size. If we assume that the unknown regions are principally sea, then the Polar Basin, including the area drained by all rivers flowing into the Arctic Sea, may be roughly estimated to contain about 14,000,000 square miles, of which half is land and half water. In the coldest part of the basin the land is either glacier or tundra, and in the warmer parts it is either forest or steppe. Greenland, the home of the glacier and the mother of the icebergs of the Northern Atlantic, rises 9,000 or 10,000 feet above sea level, whilst the sea between that lofty plateau and Scandinavia is the deepest known in the Polar Basin, though it is separated from the rest of the Atlantic by a broad belt or submarine plateau connecting Greenland across Iceland and the Faroes with the British Islands and Europe. Iceland, Spitzbergen, and

Novaya-Zemlia, the latter a continuation of the Urals, are all mountainous and full of glaciers. The glaciers of Southern Alaska are some of the largest in the world.

The Arctic Sea, which lies at the bottom of the Polar Basin, is fringed with a belt of bare country, sometimes steep and rocky, abruptly descending in more or less abrupt cliffs and piles of precipices to the sea, but more often sloping gently down in mud banks and sand hills representing the accumulated spoils of countless ages of annual floods, which tear up the banks of the rivers and deposit shoals of detritus at their mouths, compelling them to make deltas in their efforts to force a passage to the sea. In Norway this belt of bare country is called the Fjeld, in Russia it is known as the Tundra, and in America its technical name is the Barren Grounds. In the language of science it is the country beyond the limit of forest growth. In exposed situations, especially in the higher latitudes, the tundra does really merit its American name of Barren Ground, being little less than gravel beds interspersed with bare patches of peat or clay, and with scarcely a rush or a sedge to break the monotony. In Siberia at least this is very exceptional. By far the greater part of the tundra, both east and west of the Ural Mountains, is a gently undulating plain, full of lakes, rivers, swamps, and bogs. The lakes are diversified with patches of green water plants, amongst which ducks and swans float and dive ; the little rivers flow between banks of rush and sedge ; the swamps are masses of tall rushes and sedges of various species, where phalaropes and ruffs breed, and the bogs are brilliant with the white fluffy seeds of the cotton grass. The groundwork of all this variegated scenery is more beautiful and varied still—lichens and moss of almost every conceivable colour, from the cream-coloured reindeer moss to the scarlet-cupped trumpet moss, interspersed with a brilliant alpine flora, gentians, anemones, saxifrages, and hundreds of plants, each a picture in itself, the tall aconites, both the blue and yellow species, the beautiful cloudberry, with its gay white blossom and amber fruit, the fragrant *Ledum palustre* and the delicate pink *Andromeda polifolia*. In the sheltered valleys and deep watercourses a few stunted birches, and sometimes large patches of willow scrub, survive the long severe winter, and serve as cover for willow grouse or ptarmigan. The Lapland bunting and red-throated pipit are everywhere to be seen, and certain favoured places are the breeding grounds of snipe, plover, and sandpipers of many species. So far from meriting the name of barren ground, the tundra is for the most part a veritable paradise in summer. But it has one almost fatal drawback, it swarms with millions of mosquitoes. The tundra melts away insensibly into the forest, but isolated trees are rare, and in Siberia there is an absence of young wood on the confines of the tundra. The limit of forest growth appears to be retiring southward, if we may judge from the number of dead and dying stumps ; but this may be a temporary or local variation caused by exceptionally severe winters. There are no trees on Novaya-Zemlia. Two or three species of willow grow there, but they are dwarfs, seldom attaining a height of 3 in. Novaya-Zemlia enjoys a comparatively mild winter, the mean temperature of January, thanks to the influence of the Gulf Stream, being 15 deg. Fahr. above zero in the south, and only 5 deg. Fahr. below zero in the north. The absence of trees is due

to the cold summers, the mean temperature of July not reaching higher than 45 deg. Fahr. in the south, whilst in the north it only reaches 38 deg. Fahr. After some observations on the steppe regions and on the anthropology of the Polar Basin, Mr. Seebohm expressed his opinion that life areas, or zoo-geographical regions, are more or less fanciful generalizations. Animals recognize facts, and are governed by them in the extension of their ranges; they care little or nothing about generalizations. The mean temperature of a province is a matter of indifference to some plants and to most animals. The facts which govern their distribution are various, and vary according to the needs of the plant or animal concerned. To a migratory bird the mean annual temperature is a matter of supreme indifference. To a resident bird the question is equally beside the mark. It is very important, however, to remember that it is actual temperature that governs them, not isotherms corrected to sea level.

After remarking on the eccentricity of isothermal lines in the Polar Basin, the President described the intimate relations which subsist between geography and geology. A knowledge of geography, he said, is absolutely essential to the geologist. To discriminate between one kind of rock and another is a comparatively small part of the work of the geologist. To ascertain the geographical distribution of the various rocks is a study of profound interest. If the geologist owes much to the geographer the latter is also largely indebted to the labours of the former. The geology of a mountain range or an extended plain is as important to the physical geographer as the knowledge of anatomy is to the figure painter. The geology of the Polar Basin is not very accurately known, and the subject is one too vast to be more than mentioned on an occasion like the present; but the evidences of a comparatively recent ice age in Eastern America and Western Europe are too important to be passed over without a word. In the sub-Arctic regions of the world there is much evidence to show that the climate has in comparatively recent times been Arctic. The present glaciers of Central Europe were once much greater than they are now, and even in the British Islands glaciers existed during what has been called the ice age, and the evidence of their existence in the form of rocks, upon which they have left their scratches and heaps of stones, which they have deposited in their retreat, are so obvious that he who runs may read. Similar evidence of an ice age is found in North America, and to a limited extent in the Himalayas, but in the alluvial plains of Siberia and North Alaska, as might be expected, no trace of an ice age can be found. The extreme views of the early advocates of the theory of an ice age have been to a large extent abandoned. No one now believes in the former existence of a Polar ice cap, and possibly when the irresistible force of ice-dammed rivers has been fully realized, the estimated area of glaciation may be considerably reduced. The so-called great ice age may have been a great snow age with local centres of glaciation on the higher grounds.

Mr. Seebohm then gave a graphic description, largely drawn from personal experience, of the succession of the seasons in these high latitudes. He said the stealthy approach of winter on the confines of the Polar Basin is in strong contrast to the catastrophe which accompanies the sudden onrush of summer. One by one the flowers fade and go to seed, if they have been fortunate enough to attract by

their brilliancy a bee or other suitable pollen-bearing visitor. The birds gradually collect into flocks, and prepare to wing their way to southern climes. Strange to say it is the young birds of each species that set the example. They are not many weeks old. They have no personal experience of migration, but Nature has endowed them with an inherited impulse to leave the land of their birth before their parents. Probably they inherit the impulse to migrate without inheriting any knowledge of where their winter quarters are to be found, and by what route they are to be sought. The date upon which winter resumes his sway varies greatly in different localities, and probably the margin between an early and a late season is considerable. In 1876 Captain Wiggins was frozen up in winter quarters on the Yenisei in latitue 66½° on October 17th. In 1878 Captain Palander was frozen up on the coast 120 miles west of Behring Strait, in latitude 67¾°, on September 28th. The arrival of summer in the Arctic regions happens so late that the inexperienced traveller may be excused for sometimes doubting whether it really is coming at all. When continuous night has become continuous day without any perceptible approach to spring an Alpine traveller naturally asks whether he has not reached the limit of perpetual snow. It is true that here and there a few bare patches are to be found on the steepest slopes, where most of the snow had been blown away by the wind, especially if these slopes face the south, where even an Arctic sun has more potency than it has elsewhere. It is also true that small flocks of little birds—at first snow-buntings and mealy redpolls, and later shore larks and Lapland buntings —may be observed to flit from one of these bare places to another, looking for seeds or some other kind of food, but after all evidently finding most of it in the droppings of the peasants' horses on the hard snow-covered roads. The appearance of these little birds does not, however, give the same confidence in the eventual coming of summer to the Arctic naturalist as the arrival of the swallow or the cuckoo does to his brethren in sub-Arctic and sub-tropic climates. The four little birds just mentioned are only gipsy migrants that are perpetually flitting to and fro on the confines of the frost, continually being driven south by snow-storms, but ever ready to take advantage of the slightest thaw to press northwards again to their favorite Arctic home. They are all circumpolar in their distributions, are as common in Siberia as in Lapland, and range across Canada to Alaska as well as to Greenland. In sub-Arctic climates we only see them in winter, so that their appearance does not in the least degree suggest the arrival of summer to the traveller from the south. The gradual rise in the level of the river inspires no more confidence in the final melting away of the snow and the disruption of the ice which supports it. In Siberia the rivers are so enormous that a rise of five feet or six feet is scarcely perceptible. The Yenisei is three miles wide at the Arctic Circle, and as fast as it rises the open water at the margin freezes up again, and is soon covered with the drifting snow. During the summer which I spent in the valley of the Yenisei we had six feet of snow on the ground until the 1st of June. To all intents and purposes it was mid-winter, illuminated for the nonce with what amounted to continuous daylight. The light was a little duller at midnight, but not so much so as during the occasional snowstorms that swept through the forest and drifted up the broad river bed. During the month of May there were a few

signs of the possibility of some mitigation of the rigours of winter. Now and then there was a little rain, but it was always followed by frost. If it thawed one day it froze the next, and little or no impression was made on the snow. The most tangible sign of coming summer was an increase in the number of birds, but they were nearly all forest birds, which could enjoy the sunshine in the pines and birches, and which were by no means dependent on the melting away of the snow for their supply of food. Between May 16th and 30th we had more definite evidence of our being within bird flight of bare grass or open water. Migratory flocks of wild geese passed over our winter quarters, but if they were flying north one day they were flying south the next, proving beyond all doubt that their migration was premature. The geese evidently agreed with us that it ought to be summer, but it was as clear to the geese as to us that it really was winter. We afterwards learnt that during the last ten days of May a tremendous battle had been raging 600 miles as the crow flies to the southward of our position on the Arctic Circle. Summer in league with the sun had been fighting winter and the north wind all along the line, and had been as hopelessly beaten everywhere as we were witnesses that it had been in our part of the river. At length, when the final victory of summer looked the most hopeless, a change was made in the command of the forces. Summer entered into an alliance with the south wind. The sun retired in dudgeon to his tent behind the clouds, mists obscured the landscape, a soft south wind played gently on the snow, which melted under its all-powerful influence like butter upon hot toast, the tide of battle was suddenly turned, the armies of winter soon vanished into thin water and beat a hasty retreat towards the Pole. The effect on the great river was magical. Its thick armour of ice cracked with a loud noise like the rattling of thunder, every twenty-four hours it was lifted up a fathom above its former level, broken up, first into ice floes and then into pack ice, and marched down stream at least a hundred miles. Even at this great speed it was more than a fortnight before the last straggling ice-blocks passed our post of observation on the Arctic Circle, but during that time the river had risen seventy feet above its winter level, although it was three miles wide, and we were in the middle of a blazing hot summer, picking flowers of a hundred different kinds, and feasting upon wild ducks' eggs of various species. Birds abounded to an incredible extent. Between May 29th and June 18th I identified sixty-four species which I had not seen before the break-up of the ice. Some of them stopped to breed and already had eggs, but many of them followed the retreating ice to the tundra, and we saw them no more until, many weeks afterwards, we had sailed down the river beyond the limit of forest growth. The victory of the south wind was absolute, but not entirely uninterrupted. Occasionally the winter made a desperate stand against the sudden onrush of summer. The north wind rallied its beaten forces for days together, the clouds and the rain were driven back, and the half-melted snow frozen on the surface. But it was too late; there were many large patches of dark ground which rapidly absorbed the sun's heat; the snow melted under the frozen crust, and its final collapse was as rapid as it was complete.

It is not always easy to interest an audience in the

Polar Basin, and Mr. Seebohm's address fully deserved the vote of thanks with which it was received. The phenomena which mark the coming and the triumph of the Northern summer are well described, but Mr. Seebohm's battlepiece is only an amplification of Thomson's, and, with all its effectiveness, the Hudibrastic simile of the buttered toast owes its inspiration perhaps too directly to the famous couplet:

> And, like a lobster boiled, the morn
> From black to red began to turn.

Papers were read—by Mr. Guy Boothby, describing his journey across Australia from north to south; by Mrs. Lilly Grove, F.R.G.S., on her visit to Chiloe and the neighboring islands; and by Mr. Herbert Ward, on Environment in Relation to the Native Tribes of the Congo Basin.

At a combined meeting of Sections C. and E. to discuss the limits between Geology and Geography, the first paper was read by Mr. Clements R. Markham, F.R.S., who, in considering the boundary-line between geology and physical geography, approached the subject as a geographer. From a central geographical position the limits of their science might be defined, distinguishing between the subjects which were within their boundary and those which, although clearly belonging to another division of knowledge, were still pertinent to their inquiries. The first work of geographers was to measure all parts of the earth and sea and to fix the relative positions of all places on the earth's surface. They first established the locality, and then studied the phenomena within a given area and the changes which had taken place during historical times—the changes respecting which there was human testimony in some shape or form, not necessarily written testimony. These changes generally explained to us the laws according to which similar changes were now taking place around us. This was physical geography. From the point of view of its connexion with physical geography he took geology to be a study of the condition of the earth and of the changes that had taken place on its surface during the cycles of ages previous to the dawn of history. Sir Roderick Murchison used to say that the geologist was the physical geographer of former periods. When he studied the phenomena of physical geography it was to collect *data* which would enable him to solve some problem of remote ages. The geologist and the geographer used the same materials, but for different purposes—the former to find interpretations of problems relating to the past, the lat-

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ter to explain what was actually taking place in the present. The physical geographer certainly had to learn from geology the influence that the nature of the various rocks and their present positions had had, and still had, on the features of the earth's surface as we now saw them. For instance, the causes which decided the direction of river-beds could generally be ascertained by a study of the nature of the rocks and of their inclinations round the fountains and along the river courses. But the objects of such study were different from those of the geologist; and no geological facts or arguments came within the sphere of the geographer's work unless they helped to explain an existing geographical feature. The aid derived by the closely allied sciences from each other did not interfere with the enunciation of a distinct limit between them. He believed this boundary-line was to be found where human testimony ceased. Geography fixed localities. It found certain physical phenomena peculiar to each locality, and it sought for their causes. In such research the two sciences of geology and geography were on common ground; but while the object of the former was to obtain explanations of phenomena in the remote past, that of the latter was to seek reasons, from the testimony of history, for the condition of the locality as the geographer saw it before him. In order to test the application of a canon intended to define the boundary line of the two sciences, it would be well to select some given area for the purpose. The great valleys of the Ganges and the Indus would be suitable. If we went back to the earliest human records, we should find that the inhabitable part was confined to the water-parting between the Jumna and the Sutlej. All the rest of the present valley of the Ganges was an arm of the sea. The vast region between Delhi and Calcutta had become habitable within the historical period. As dynasty succeeded dynasty, we found the foundation of cities recorded in situations lower and lower down the valley. The physical geographer compared the records of history with what he could now see with his own eyes. The process that was going on was described by Mr. H. F. Blanford. Standing on the banks of the Ganges, and watching the turbid flood swirling past, the observer saw the *chur* opposite, which the river left dry when its waters fell at the close of the last rainy season. Until lately it was covered by a rich green crop of indigo. It was now more than half cut away and buried beneath the waters. Huge masses detached themselves from time to time and were swallowed up by the deep, muddy stream. These were present facts. The inquirer then learnt that half a century ago the river itself was only a moderate-sized *khall*, and that an old channel, seven or eight miles off, and now little more than a string of pools, was at that time a great river. Turning to history, he would find that the ancient records of the people gradually unfolded the causes and effects of what he had seen and heard. The positions of the capitals of the different dynasties which successively reigned in the valley plainly continued the story, until the Vedas were reached. Then the whole wonderful record was unfolded through the help of human testimony. If we came nearer home we saw how the remarkable phenomena connected with the long battle between the land and the sea at the delta of the Rhine taught another memorable lesson in physical geography, with the aid of history. We saw what was going on now; the dunes protecting Holland from

destruction, the Zuyder Zee, the numerous islands, and the tracts of reclaimed land. Human testimony explained the causes which produced the present condition of this region, and the gradual changes in the course of centuries. The slow movement of the dunes was revealed to us by the statue and temple of Nehelennia, which was uncovered some years ago on the Domburg Sands. A drive of 12 miles northward from Bruges conducted the inquirer to the little country town of Sluys, which was surrounded as far as the eye could reach with cornfields and meadows, and clumps of tall trees. The student of Froissart read how our King Edward III. gained a great naval victory over the French fleet on this very spot. If he continued his researches and studied the histories of the great struggle between the United Provinces and Philip II. of Spain, he would find that a change had slowly but surely been taking place. Sluys was still a port, but with very different surroundings from the Sluys of the 14th century. From that time he might trace its story, with the aid of a succession of maps, down to the present day. This was physical geography, explained and illustrated by the aid of history. The earlier record of the same region when the mouth of the Rhine was somewhere in the latitude of the Orkneys, and the river-drift men tenanted what was then a part of a continent, but was now the island of Britain, as distinctly belonged to geology. The interesting facts connected with it were not ascertained by human testimony, but by other methods and for other objects. Here again we found a natural boundary-line between geology and geography, by means of which the whole body of facts relating to a locality could be logically divided between the two sciences, and conveniently classified. It was thus that physical geography found most efficient assistance from human testimony, for the study of the former condition of parts of the earth's surface at different epochs. It need not always be written testimony. The splendid temples of Selinunte on the south coast of Sicily, and the direction in which they had been thrown down, were the silent witnesses to a great earthquake in the eighth century. We had seen, too, how the statue of the goddess Nehelennia explained the direction and rate of movement of the sand-dunes of Zeeland. It was this testimony respecting the condition of the earth's surface at long intervals of time, which gave such importance to the editing and the study of old voyages and travels. Hence, every physical geographer ought to be a member of the Hakluyt Society. By careful reading, and by knowing what he wanted, he would pick many a plum out of the heaviest pudding. But, in truth, the quaint old narrators of voyages and travels were very rarely dull. The student of physical geography was sure to be rewarded by their perusal. He might be giving his attention to the formation of coral islands, and perhaps meditating on the question whether Bermuda once formed a great circle enclosing a lagoon. The existing evidence was the small west rock on the western reef gradually being reduced in size by the action of the waves. Further evidence of the dimensions of this rock in former times would be important. A man named Henry May went out as a mate with Lancaster in his first voyage to the East Indies, three centuries ago. May lost his ship somewhere near Puerto Rico on his return voyage, and took a passage home in a French vessel. He was shipwrecked on the western reef of Bermuda, and his journal supplied evidence respecting that west rock. He de-

scribed that land as consisting in his time of "high cliffs." Further research might reveal its dimensions at some other period, and so help the researches of geographers; for the narrative of Bermudez, the discoverer of this coral group, was still buried in Spanish archives. When the explorer made new discoveries, their true significance could only be established by the testimony of history. The region round Lake Zuwaya to the south of Abyssinia was almost unknown, and was consequently very interesting to geographers. It was unvisited for centuries, and Mr. Ravenstein, our greatest authority on Africa, had to go back to the enterprises of the Portuguese to find any traces of it. Thus it was that we appreciated the value of the narrative of Father Alvarez, who accompanied the embassy of Rodrigo da Lima to Prester John; for one of the members of this embassy, in a journey to the southward of Abyssinia, described the lake, which had again been revealed to us by modern travellers after an interval of three centuries. Earthquakes composed another series of phenomena which belong to geology or geography, as they occurred before or after the dawn of human testimony. Seismology was a department of geography, and the record of earthquake phenomena could only be completed by researches into the history of the past. The colonial records, in the Spanish archives, thus enabled us to form a descriptive list of the earthquake phenomena on the western coast of South America, for the last three centuries; and similar chronological series could be gathered from historical documents, as regarded several other parts of the world. In all these departments the line between geology and geography could be defined without strain or danger of confusion; and the result of the consideration of the question of limits, from this point of view, seemed to be that it could be settled naturally and without undue concession on either side. The two sciences depended upon each other and were very closely allied. The geologist found the same phenomena in the rock formations of the past as the physical geographer discovered on the surface of the earth of the present. Both, for example, had the duty laid upon them of seeking out the agencies which rule in the processes of upheaval and depression. The fold, with its crest and trough, was common to both sciences; and geographers had rejoiced at the announcement of "a wedding-ring of geology and geography uniting them at once and forever in indissoluble union."

Mr. W. Topley, F.R.S., of the Geological Survey of England and Wales, approached the question from the geological standpoint. He admitted that physical geography is to a large extent the foundation of geology, inasmuch as a geologist must study processes now in action before he can understand the manner in which rocks, now forming the earth's surface, have been formed. On the other hand, the existing surface features of the earth can only properly be understood when viewed in relation to their geological structure. From this point of view geology is the foundation of physical geography. The range, shape, and character of these surface features are determined by the nature of the rocks and by the manner in which these rocks are arranged. Familiar illustrations of this point are afforded by the escarpments and valleys of England and France. It is equally apparent in the more complicated structure of mountains. The rocks of mountain ranges and their flanking hills are often contorted and inverted, so that the apparent succession

is not the real one; but even here the surface features are equally controlled by the manner in which the rocks now lie. The existing surface of the land is almost entirely due to denudation; the manner in which this acts and the results developed vary with the nature and "lie" of the rocks. The soils of a district have mostly been produced by the weathering of rocks, etc., at the surface. The soil and the facility for obtaining water have determined the original settlement of any area. The land divisions consequent on such early settlement have been equally determined, in many parts, by geological structure.

The discussion was opened by Mr. Ravenstein, who combated the notion that physical geography was a new department of geology. Physical geography and geology stood to each other in a similar relation to that which existed between history and political geography. The physical geographer should concern himself with the composition and physical character of the rock and leave its history and development and age to the geologist.

Prof. Lapworth, of Birmingham, thought the two sciences shaded imperceptibly into each other. The stratigraphical geologist was indebted at every turn to his friend the physical geographer, and it was impossible clearly to define where the work of the one began and that of the other ended.

Prof. Valentine Ball, of Dublin, spoke in strong terms of condemnation of bad maps, and said that geographical students ought to study geology, which was the anatomy of the earth.

Dr. R. D. Roberts defined geology as the veracious history of the earth, which, if it could be told in detail, would explain the evolution of the earth from the physical geography of the past to that of the present.

Mr. Yale Oldham, University lecturer in geography at Cambridge, preferred to recognize physical geography as one of the branches of the great science of geography, which had also its historical, economic, and other aspects. The same sub-division of science which was so discernible in what was now called biology was at work in the two sciences of geology and geography.

The Rev. Prof. Bonney said that to try to make out the limits of geology and geography was very like trying to define the boundaries of a river which flowed into the sea and the sea itself. The real distinction was sufficiently indicated in the words themselves; one was earth description, and partook of the nature of an art. Geology, on the other hand—"Earth reason"—was rather a science than an art.

Col. Godwin-Austen was at a loss to understand how Mr. Markham's historical canon of the distinction between geography and geology could apply to two such countries as Australia and Egypt, the length of whose historical records was so widely different.

Sir A. Geikie spoke as having one foot in each of the two sciences. It was desirable that some line of cleavage should be drawn, though he hardly thought Mr. Markham's suggestion would find general acceptance. Geography might be regarded as the history of the earth; but the objection to Mr. Markham's theory was that discoveries might from time to time remove a series of phenomena from geology to geography.

Mr. W. M. Conway recounted his experiences in the Karakoram Mountains. Kashmir, he said, was very different from the idyllic land described by poets. It might be called a crumpled Sahara, with rocks and precipitous slopes, naked and without moisture or shade, and, in short, an *impossible* wilderness; which appears to be something that defies geology and geography, as well as language. A letter just received from a British officer stationed at Gilgit gave an account of a flood which began on July 7th and in five days wrought a geological revolution. The peaks of the Karakoram Mountains range from 20,000 to 28,000 feet in height. They are very unlike the Alps, and are mostly in the form of towers of remarkable sharpness.

The still unsettled question of the theory of coral formations was discussed by the Geological and Biological Sections.

Professor W. Sollas opened the discussion by giving an historical account of the various hypotheses which had been advanced to account for the phenomena connected with coral reefs and atolls. He concluded by contending that Darwin's theory that the reefs were a later stage of barrier reefs erected on subsiding land was the true one. This theory was one of great simplicity and beauty, and one which accounted for all the facts which geology presented. The opposition which Agassiz offered to the theory was founded mainly on his study of the coral reefs of the Florida coast; but these reefs had been studied by Darwin, who came to the same conclusion as Agassiz as to those particular reefs. The great weakness of Darwin's case at the time of its enunciation was the absence of fossil reefs comparable with atolls, and this was pointed out by Charles M'Laren many years ago. Darwin, however, believed that such reefs would ultimately be found, and his expectation had been abundantly verified. In England there were only small remains of the kind, but in the Tyrol the Langkofen had a thickness of limestone to be identified with coral of over 3,000 feet.

Dr. Hickson quite agreed with Professor Sollas in thinking that Darwin's hypothesis was both simple and beautiful, but that was about the only point on which they agreed. Some few atolls, or groups of atolls, such as, for instance, the Fiji Archipelago, might possibly have been formed during subsidence, but the vast majority of atolls and barrier reefs could not be formed in that manner. The evidence was quite conclusive that many atolls occurred in regions where elevation

had recently taken place, and was probably occurring now. Several points mentioned in Professor Sollas's address were not in accordance with recent observation. He hoped that, as a result of this discussion, some further investigations would be made on the rapidity and direction of the growth of coral reefs at the present day.

Dr. A. Rothpletz (of Munich), having a personal acquaintance with the region of the "dolomites," said some of the sections shown were not correct. In one case what was shown as overcast strata lying upon the dolomite was in reality below it. Moreover, great masses of rock within the area of the "dolomites," and which were usually called "Schlerndolomit," were not dolomite but limestone. The fossils contained in those were at present being worked out, and they included a large number of ammonites, bivalves, algæ, etc. Corals were not wanting even in the dolomite.

Mr. Gilbert Bourne said that it had been stated that reef-building corals flourished best where the breakers were heaviest on the edge of the reef. His own experience was that at these points only a few true corals grow and that the gardens of corals described by Professor Sollas were only to be found in quieter spots, where the corals were sheltered from the force of the breakers but bathed by a gentle and uniform current. Photographs of luxuriant coral beds bore out this assertion. Nor did he agree with the statement that the rock of which atolls were composed was formed by masses of corals flung over the edge of the reef by the waves. Dr. Guppy had shown that the large masses torn off at the edge of the reef tended rather to roll down the seaward face of the reef and to form a talus slope. It had been said that soundings of lagoons showed a filling up and shallowing of the lagoon. On what evidence did this assertion rest? Probably no atoll had been so thoroughly surveyed as the one with which the speaker was personally acquainted—the atoll of Diego Garcia. It was surveyed by the French at the end of the last century, by Captain Moresby in 1837, and nearly 50 years later by her Majesty's ship Rambler—in 1885. He had very carefully compared the soundings made by Captain Moresby with those made by the Rambler, and found that in nearly every case the soundings were almost identical, with the exception of a few channels in which, on the whole, the Rambler soundings showed greater depths. It must be remembered that the old soundings made with a hemp line were not always trustworthy and that they commonly gave rather greater depths than the soundings made with wire.

After referring to Semper's observations in the Pelew Islands, in which atolls, barrier-reefs, fringing-reefs, and recent elevated coral reefs were found in the same area, he said the information just given by Professor Rothpletz fully bore out the assertions made by Murray and Agassiz, that the upward growth of submarine banks was largely due not to coral growth, but to the accumulation of the calcareous skeletons of molluscs and echinoderms on those banks, while Professor Sollas had revived the old theories of a Lemuria and an Atlantis—theories which most people held to be long ago exploded—and had dwelt on the existence of coral islands in the Indian Ocean as evidence of a previously existing continent stretching from Africa and Madagascar to Ceylon and India. He had given no explana-

tion of the fact that the tropical regions of the Atlantic Ocean, across which the old Atlantis was supposed to have stretched, are almost entirely destitute of coral formations.

Professor Bonney replied to Dr. Hickson's criticism on the relation of a reef to the island within, that a general correspondence was all that could be expected. He thought that at present the Tyrol dolomites must be carried to a suspense account, though certainly corals were a constituent. But he asked was there any evidence that a growing reef was found deeper than about 25 fathoms, for that was a point of first importance.

Sir H. Howorth, M.P., limited himself to the question of whether coral reefs are now growing in districts of upheaval or subsidence. The Pacific consists of two regions. One, the North Pacific, containing the Sandwich Archipelago, and the other consisting of the rest of the scattered islands of the Pacific, which are nearly all coral islands, while the former possesses a very peculiar fauna and flora containing a great many endemic species, pointing to its being a very old land surface which has subsided and been broken up into an archipelago. The other islands east of the Solomon Islands are occupied by accidental plants and animals, waifs and strays, which point to their having very recently risen from the sea, and therefore being *à priori* situated in an area of elevation. This is confirmed where we have positive evidence of the actual change of level going on at this moment where the corals are growing. We have such evidence in the case of the Philippines, Java, the Australian reef, the Fiji Islands, etc. We have sea beaches and other evidences of quite recent, if not current, elevation. A third class of evidence is the occurrence of solid and consolidated strata of coralline origin in such places as Florida, the Bahamas, Guadeloupe, and in many localities in the Pacific where coral reefs are still growing, which can only be explained by the areas in which they occur being areas of upheaval.

Rev. T. R. R. Stebbing observed that, as Darwin himself admitted, coral reefs might be begun in either one area or the other, but that the favorable situation was found to be in areas of subsidence. In answer to the inference drawn from the consensus of recent observers who were opposed to Darwin's theory, Mr. Stebbing called attention to the fine work on "The Great Barrier Reef of Australia," by Mr. Saville-Kent, that author entirely endorsing Darwin's view, as a result of his long-continued explorations in Queensland.

Mr. H. O. Forbes made some remarks on his observations in the Keeling Islands in the Indian Ocean. He pointed out that he had observed undoubted evidence of elevation both between two of the islets of the lagoon and in the construction of Horsburgh Island, the largest member of the group.

Professor Sollas, in reply, said his enlightenment had been of a different nature to that which he had anticipated, for the objections of most of the speakers were so easily met that his last lingering doubts as to the efficacy of Darwin's hypothesis had been wholly dispelled. He had been asked by Dr. Hickson for an instance of a reef with a steep seaward slope, and in reply he instanced the soundings recently made by Admiral Chambeyron on the reef of New Caledonia, when 600 metres from the edge the slope was found to vary from 51° to nearly 90°.

That the limestones of the Tyrol were not wholly dolomitic was well known, but they were usually structureless, and the rapid disappearance of structure from the coral growths of existing reefs is a familiar fact. That overcast bedding should occur below reef limestone was compatible with the mode of reef growths, but Dr. Rothpletz admitted that, if the limestones of the Tyrol were not coral reefs, those of the Eastern Alps are, and as these are sometimes 400 fathoms in thickness they fully supported Darwin's case. As regards Mr. Bourne's observations on the filling up of lagoons, Professor Sollas cited the instance of Elizabeth Reef, in the Coral Sea, where, in 1820, Captain King found a deep lagoon. It did not need wire sounding-lines to ascertain this, and in 1877 the greater part of this lagoon was found to be filled up to about one-and-a-half fathom. Lemuria and Atlantis he did not revive. The tract of land which Neumayer had mapped as existing across the Indian Ocean in Jurassic times was not Lemuria, and its existence was supported by the observations of most of the geologists on the Indian Survey, including its director, Mr. Oldham. In the Pelew Islands there did exist raised reefs, but these were on the margins of a recently sunken area. None of the opponents of Darwin's view had raised any objections which, when examined in detail, did not rather sustain than damage it.

WASHINGTON LETTER.

WASHINGTON, September 25, 1893.

NEW GEOGRAPHY.—The recently published report on the population and resources of Alaska at the eleventh census—a 4to volume of 293 pages and 75 plates—must be regarded as the latest reliable geographical and statistical account of this interesting domain. Under seven sub-divisions, known respectively as the Southeastern, the Kadiak, the Unalaska, the Nushagak, the Kuskokwim, the Yukon, and the Arctic districts, apportioned among several investigators, viz.: Miner W. Bruce, Eliza R. Scidmore, Henry Boursin, Samuel Applegate, Alfred B. Schanz, William C. Greenfield and Henry D. Woolfe, the descriptions of the tribes and their districts, geography and topography, manners and customs, superstitions and ceremonies, diseases, dwellings, food supplies, etc., are treated from the standpoint of actual habitation. A goodly number of men know intimately some portion of Alaska. It is safe to say that no one man can speak from personal knowledge of all portions.

On an estimated area greater than that of all the States north of Tennessee and east of the Mississippi there is a population of 32,052, or less than in most single counties of the populous east.

General Halleck in 1868, by means of unconscious duplication of tribes under similar names and the insertion of a few imaginary ones, "officially" reported

82,400 people in Alaska; and to this Rev. Vincent Collyer in the same year added 11,900 as a special estimate of the Thlingit tribes. It has required a long time and severe services to get "cold facts" from Alaska, and evidently "bottom facts" have not yet been reached in too many instances.

The last ten years have witnessed greater progress in the knowledge of the geography and topography of this territory than any corresponding period since its discovery. The expeditions to the Alpine coast region and Mount St. Elias by Schwatka, Libbey, Seton-Karr, and Russell; the interior explorations by Schwatka, Dr. Hayes, and the Frank Leslie Illustrated Weekly expedition; the exploration of the course of the Copper River by Abercrombie and Allen; of the region of the Upper Yukon and the Porcupine River by McGrath and Turner; of the basins of the great Kowak and Noatak rivers by Cantwell and Stoney; the soundings and surveys by the Coast Survey, the U. S. Revenue Marine, and the U. S. Fish Commission steamer *Albatross* comprise the substance of geographical work.

A report of the expedition to Muir Glacier, Alaska, under the charge of Prof. H. F. Reid, of Cleveland, has been recently published as an appendix to the report of the United States Coast and Geodetic Survey for 1891. This expedition was organized in the spring of 1890, and consisted of Prof. Reid, H. P. Cushing, H. McBride, R. L. Casement, J. F. Morse, and C. A. Adams. The party remained in camp from July 1 until the middle of September, mapping and studying the locality. The report embraces a general geography of the region, with a description of Glacier Bay, Muir

Inlet, Muir Glacier, its tributaries, drainage, geology, and the probable changes going on.

A great deal of old, and some new geographical information concerning the Orange Free State is communicated by the American consular agent in the July and September issues of the consular reports. The statistics of diamond mining are new and interesting, and especially an account of the 971 carat stone recently (June, 1893) found in the Jagersfontein mine.

The only general account concerning the island of St. Christopher—discovered by Columbus, and given his Christian name—ever printed in the consular reports is that by Stephen W. Parker in the September issue.

Among other interesting items he notes that out of a population of 31,000 there are few pure-blooded white people. No elections are held because the people, although emancipated fifty years ago, are, as a mass, not sufficiently intelligent to rule themselves. The members of the legislature are appointed by the Governor. The island has been a sanitarium for the last one hundred years or more; but Mr. Parker regards the neighboring island of Nevis as the best winter resort in the world. No crop other than sugar is considered, and this to the value of $2,000,000 is annually raised and exported—largely to the United States.

Lieutenant A. F. Fechteler of the U. S. Steamship *Albatross* reports to the Navy Department some very recent information, accompanied by two charts, of the Shumagin Islands in the Gulf of Alaska.

Lieutenant Alexander McCrakin of the U. S. Steamship *Marion* communicates information pertaining to Koh Kram, near the eastern shore of the Gulf of Siam.

Except on the hilltops the country is thickly wooded. The surface is generally hilly and rises to a height of about 700 feet above the level of the sea. An engraved sketch of Koh Kram bay on the northwest side of that island accompanies *Notices to Mariners* for Sept. 2, 1893.

The "Cherokee Strip," so called, which was recently added to the territory of Oklahoma, is 200 miles long, 56 miles wide and embraces 8,144,682 acres.* It lies between the 96th and 100th meridians of west longitude, with the southern border line of Kansas as its northern boundary, and the Creek country and territory of Oklahoma as its southern. It is said to be the finest body of land of its size on the American continent, "With soil of surpassing richness and depth, mineral resources of great value and inexhaustible quantity, natural scenery unrivalled, and a climate of delicious mildness and salubrity." Topographically it is a rolling country and plenteously watered. The soil of the bottom lands and prairies is soft and loamy, and offers ideal conditions for the unlimited production of corn, wheat, tobacco, cotton and potatoes. The strip is already traversed by four lines of railroads with several other lines just a little outside. The price paid the Cherokees by the Government for the relinquishment of their interest in these lands was $8,595,736, or $1.05 per acre. The prices fixed by law to resell to homesteaders are $2.50, $1.50 and $1.00, according to location. Some of the land between meridians 96 and 97½ is said to be worth at least $50 per acre. So eager is the desire to obtain possession that the territory of Oklahoma will in all probability, within a

* 200 miles x 56 = 11,200 x 640 acres = 7,168,000.

month, have an accretion of at least 30,000 to its population.

Boundaries and Arbitration and Topography.—Near the waters of the boundary line between the United States and Canada lies Pope's Folly Island. The island is not valuable in time of peace, but in case of war it would be a decided advantage to the country possessing it. The possession of this island has long been in dispute. It appears that the first chart issued by Great Britain showing the boundary line between the United States and Canada gave the former country the island, but a subsequent chart includes it in Canadian territory. The discovery of the first chart is quite recent. The Superintendent of the Coast and Geodetic Survey and Hon. W. F. King, of Canada, are Commissioners to determine the ownership.

The same gentlemen have still in charge the survey of that part of the line which separates the narrow strip known as Southeast Alaska from British Columbia. The operations of the surveying party this season will be confined to the vicinity of three rivers which cross the narrow strip of territory involved. These rivers begin just north of the Portland Canal and are the Unuk, the Stikine and the Taku.

Prof. George Davidson, assistant in charge of the division of the Coast Survey on the Pacific coast is engaged with a party near Carson City, Nevada, making observations to determine the disputed boundary between California and Nevada.

Capt G. S. Anderson, U. S. A., the acting superintendent of the Yellowstone Park, recommends that

the boundary lines of the Park be resurveyed and marked. He says that the most disastrous forest fire of many years occurred during July of this year, when a strip about seven miles long and two or more miles wide was destroyed. Wild game is very abundant, but poaching is on the increase. The Secretary of the Interior, who recently visited the Park, says that its geysers, lakes, mountains and canyons are beautiful and interesting beyond description, and that more of nature's wonders and beauties could be seen there than anywhere else.

Within a few months the case of dispute between Argentina and Brazil for the fertile territory lying between the rivers Uruguay and Paraná, which goes by the name of Misiones, will come up for settlement before the President of the United States, who has been selected as arbitrator by the two Republics. This dispute has been maintained for a century and a half in succession between Spain and Portugal, and between Argentina and Brazil as the heirs of their mother countries. The Jesuit fathers planted their missions in this region (hence the name) and taught the natives agriculture, handicrafts and church ceremonies. These natives were faithful, peaceful and industrious, and with the natural advantages of climate and a most prolific soil, the interfluvial territory whose lines had never been properly fixed became and continued to be the object of longing desire by both countries. Señor Zeballos, the new Argentine minister to the United States, is specially charged with the management of the case against Brazil, and will present the argument of his country.

Señor Zeballos is a scholar and writer of note. He established the Geographical Society, and organized expeditions to Patagonia, the lands of the Araucanians, the desolate grassy leagues of the Gran Chaco and other parts of the Argentine but little known. He is the author of "Visit to the Araucanian Indians" and "Conquest of Fifteen Thousand Leagues," and three novels which deal with Indian life and customs. He has been accumulating materials for a history of the Paraguayan war.

The *real* victory for this country at the Paris tribunal is that the sound principles of international law for which we had always contended have been vindicated and reaffirmed. Beginning with the administration of Washington the United States have been the earnest champions and defenders of the doctrine of the freedom of the seas. We have had war in vindication of this right, and when we joined England and France in suppressing the slave trade we guarded the admission of the right of search, even in the case of suspected slavers. The pretensions put forward during the recent arbitration, to an exclusive ownership or territorial jurisdiction over the waters of Bering Sea, either as the assignee of Russia or upon any other ground, were inconsistent with all the traditions of the American people. Senator Gray, himself a distinguished jurist, well says: "I have never thought there could be any other outcome. It leaves the freedom of the seas unimpaired to the United States and all other peoples, regulated only by the comity of nations and settled international law. To no country in the world is this freedom more important than to us of the United States."

There has recently been printed a report of the proceedings of the Topographical Conference held at Washington in 1892. This Conference convened under instructions of the Superintendent of the Coast and Geodetic Survey, and held daily sessions from January 18 to March 7. Appended to the report are papers embodying the facts and reasons which have governed the members of the Conference in forming opinions and coming to conclusions on the subjects referred to them.

Among the principal conclusions formulated by the Conference were the following:

That balloon photography is not applicable for the purposes of a rapid and economical topographical survey;

Rules to govern topographical surveys in the several typical regions mentioned. Also, estimates of the approximate cost per square mile for such surveys;

That over a sparsely inhabited region a less elaborate survey, costing much less per square mile, could be made, which, though lacking in much desirable information, would prove useful in the development of that region;

That the plane-table is unequalled in its usefulness in every order of work, and that certain improvements to it should be made under the supervision of a committee;

That the mean sea level is the most desirable datum plane for elevations in topographical surveys;

That photography may be found at times a useful auxiliary, but under ordinary circumstances cannot compete with the plane table in rapidity, economy, or accuracy;

That the metre should be adopted as the unit for vertical as well as for horizontal measures;

That the methods of the Geological Survey would not prove satisfactory or economical for our coast work;

That a manual be prepared of all instruments in use by the Coast Survey, and a new table of heights, using the metre instead of the foot as the unit for elevations;

That topographic surveys, to subserve the greatest number of useful purposes, should not be made on a scale smaller than 1–40,000.

The report contains a table of scales of topographical surveys of foreign governments and the United States; plates of revised conventional signs, and notes on European topographical surveys and maps.

HYDROGRAPHIC.—A pilot chart of the Pacific Ocean is a possible new feature of work in the Hydrographic Office. While the waters of the Pacific do not afford so many interesting features as are usually shown on the pilot chart of the Atlantic Ocean, Commander Sigsbee, U. S. Hydrographer, believes that there is enough material in the way of observation of the movements of the seals, icebergs, and storms, in the Northern Pacific especially, to provide a monthly chart which will be of great value to the shipping interest of the west coast and, in fact, of the world.

Lieut. Beehler, assistant in the Bureau of Navigation, succeeds Ensign Everett Hayden in the division of marine meteorology—the science so materially developed by the latter gentleman. Lieut. Beehler is a successful naval officer and an accomplished student in matters relating to navigation. He is the inventor of

the solarometer, an instrument intended to improve the art of navigation by supplanting the compass and sextant, and by which the ship's exact position is obtainable at any time of day or night whenever a heavenly body is visible.

The Hydrographic Office has recently issued a publication by Mr. Herrle giving the depths over bars, and the draft that can be carried over, and the mean rise and fall of spring, mean and neap tides for the principal harbors and anchorages on the Atlantic and Gulf coasts of the United States.

The people on the Pacific coast of North America have high expectations of the reported enormous coal deposits in Alaska, some of which are of fine quality, and so situated as to make mining easy and inexpensive. It has been stated that some of the ledges crop out so near the shore that vessels can be loaded near the mouth of the tunnel through which the drifts are reached. The climate of Alaska will not prohibit the working of coal mines even in the winter, after the drifts and shafts and tunnels get well under the surface. A writer in the *San Francisco Post* says that the water carriage of coal from Alaska to San Francisco during the summer months when it would be brought there should be very inexpensive. A vessel could load coal and bring it there cheaper than a railroad could haul it from the Pennsylvania mines to New York.

Every one who has been through the hall beneath the dome of the Capitol has noticed the figures which run in a circle nearly around the wall, depicting the principal events in the march of American progress. A blank space has been reserved for the delineation of one of

the greatest events of all. It will portray the driving of the last spike of the first transcontinental railway. The principal character in the scene died not long ago, leaving an unparalleled legacy to the cause of education.

Few people have any definite idea of the actual sum of money represented by the property which will eventually come into the possession of the trustees of Leland Stanford University. A reliable authority on the Pacific coast says it consists of three pieces of land: Palo Alto, 8,400 acres; Gridley, 22,000 acres, and Vina, 59,000 acres. It is difficult to form an adequate idea of the money value of such land at the present time, but the yield of a fractional part of Vina alone represents an endowment of $8,000,000, and a present income of $240,000.

If all the land in the three properties which is suited to vineyard growing were planted in vines it would represent the enormous sum of $200,000,000 and an annual income equal to the *endowment* of the richest university in America. These estimates take no account of the value of these estates in the great future. At present a large portion of Palo Alto and Gridley is under high cultivation, while less than 5,000 of the 59,000 acres of Vina—the richest of all—are planted in vines.

Admiral T. A. Jenkins, who died recently in this city, was in many respects a most remarkable man. From the year 1828, when he entered the navy as midshipman to the end of his life at the age of 82, he served his country well and faithfully. Aside from his active participation in the strictly naval operations of the Government during that long and very eventful period,

his services in connection with the Coast Survey and the Light-house Board were of the highest order, and characterized by remarkable intelligence. He contributed extensively to the literature of marine meteoro logy hydrography and deep-sea temperatures. To the end of his life he was an omnivorous reader and graceful writer. Until he was taken sick he bought all the new books and was well posted in what was going on in his own profession, in science and in literature.

By long accretion, the amount now credited by the Register of the Treasury to the fund popularly known as the "Conscience Fund" amounts to $266,089.56. This account was opened in 1811 and is intended to show the receipts of money by the government from unknown persons. The funds are turned into the general treasury as miscellaneous receipts, and are used like other assets, as Congress may direct.

Apropos of this is the "Patent Office Fund," which is the excess of receipts over the expenditures of that office for many years. The amount is large—well up towards a million dollars; but as a matter of fact the balance exists only on paper, the entire receipts of the office having been turned into the treasury and used as are other receipts of the government. Nevertheless the book-keeping balance is accentuated annually by every Commissioner of Patents as an argument for a new building. The recent removal of all models from the great marble building long known as the Patent Office, to make room for other government bureaus, changes a "landmark" of Washington sight-seers. It is not likely that this collection will ever again have the extensive prominence it has so long had, but in the future it will be

accessible in plainer and more obscure quarters, while the "Patent Office" so called will be known as the "Department of the Interior." At present the long procession of inventors' models occupies the third and fourth floors of a building temporarily leased for the city Post Office. *Sic transit.* The grand structure now vacated was built exclusively for the Patent Office before the Department of the Interior was thought of. Following the order of precedent, the same fate awaits the building now being constructed for the Library of Congress. This building—one of the largest, if not the largest in Washington, excepting the Capitol, contains more space than will be required for library use for a generation to come. Meanwhile every department of the Government is overcrowded. Already interests are working quietly to secure quarters in this great building. If one, then another, and more, until the National Library building will be such in name only.

NOTES.—Since August 1st commerce has been practically suspended between Russia and Germany. Owing to disagreements in respect to a commercial treaty, negotiations were broken off, and Russia declared against Germany a retaliatory tariff in which all existing import duties should be advanced 50 per cent. Germany promptly retorted by declaring a similar increase of 50 per cent. in the duties on all imports from Russia. The value of this state of affairs to America and other exporting countries lies in the fact that the German embargo cannot be modified until the meeting of the Parliament in November, by which time most of

the rivers and canals of Russia will be closed to navigation, leaving transportation to the railways, whose rates for long distances, especially in Russia, are practically prohibitory for grain and coarse products. As the Russo-German commerce for the coming autumn and winter must therefore practically cease, American producers and exporters may well examine the nature and extent of this newly opened opportunity.

The German Minister of War has ordered the military authorities to use Indian corn mixed with oats in making up the rations for army horses. This may lead to heavy importation of American corn.

Of a total exportation of green fruits from Palermo during the year ending June 30, 1893, amounting to $2,496,083, the shipments to the United States were $2,376,929. That Florida and California will at no distant day supply the orange demand of the world is demonstrated by the constant decrease in the exportation of that fruit from Sicily to the United States. The export of last year was only half that of the preceding year, and as a consequence vast numbers of orange groves have been supplanted by the lemon.

A concession has recently been given to a Lisbon corporation to lay and operate a submarine telegraph line between Mozambique and Quilimane, 300 miles distant. There is already a line between Quilimane and Tete, a distance of about 325 miles. The same corporation is authorized to construct a line between Tete and Zumbo, 220 miles, and from Tete to Missala, 145 miles. Also branch lines to Nyassaland in British Central Africa. If these concessions are carried out, the southern part of Nyassaland and all the

Zambezi Valley under Portuguese rule will be placed in telegraphic communication with the outer world.

A very useful adjunct to the silver question is a handbook recently issued from the Government printing office containing a compilation of the coinage laws of the United States from 1792 to 1893. It was prepared under the direction of the Senate committee on Finance. An appendix includes a number of valuable statistics in connection with this question. H.

OBITUARY.

JOHN RAE, M.D., F.R.S.

Dr. John Rae, for thirty-five years a Corresponding Member of the American Geographical Society, died at his home in London on the 22d of July last. An attack of influenza in April had left him in a weakened condition, though he kept up with surprising energy and interested himself in his usual occupations to within a few days of his death.

Dr. Rae was born at the Hall of Clestrain, Pomona, Orkney Islands, September 30, 1813. He studied medicine at Edinburgh and took his degree from the Royal College of Surgeons in 1833; and shortly after went out in a Hudson's Bay Company ship to Moose Factory, on Hudson's Bay. There he remained in the service of the Company till June, 1846, when he set out, at the head of a party of ten men, in two boats, to survey the 700 miles of coast which separated Ross's explorations in Boothia from those of Parry at Fury and Hecla Strait.

Rae started from York Factory, with four months' provisions but no fuel, on the long voyage to Repulse Bay, where he wintered in N. lat. 66° 32′. The survey was accomplished in the spring. A memorandum in Dr. Rae's handwriting says, of this expedition and the one of 1853-4:

> In both of these he carried with him only four months' provisions for his party, and was absent fifteen months, having on return to York Factory one and one half month's provisions remaining. All game and fish for food were obtained by the party; chiefly deer. We had not a bit of fuel to warm our stone house with, and the smoke of the andromeda used for cooking would not go out by the chimney. We had to keep the door open all the time of cooking, as the smoke was very

pungent. The temperature usually fell 15 or more degrees when the cooking was going on. We (had) no oil for a fire lamp in the snow hut in 1853-4.

In 1848 Dr. Rae, as second in command, accompanied Sir John Richardson's expedition from the Mackenzie River to the Coppermine, in search of Sir John Franklin; and he descended the Coppermine, after Richardson's return to England. The next year, with two men, he made a sledge journey along the coasts of Wollaston and Victoria Land. The daily march was twenty-five miles, Rae pulling his own sledge and inspecting personally every turn of the coast. The journey was continued to Winnipeg and thence to Crow-Wing, Minnesota. In this expedition, which lasted nearly eight months, and covered more than 5000 miles, Rae explored seven hundred miles of coast previously unknown.

The Founder's gold medal of the Royal Geographical Society was awarded to him in 1852, and in 1853 he took command of another expedition, fitted out expressly for him by the Hudson's Bay Company, for the purpose of tracing the west coast of Boothia as far north as Bellot Strait and uniting the surveys of Sir James Ross and Dease and Simpson. His success was complete; he surveyed 400 miles of coast not laid down on the map and proved that King William Land was an island.

Among the Eskimo he found and secured many relics of Sir John Franklin's party, and the information he acquired dispelled the mystery which had shrouded the fate of those heroic men. When Dr. Rae returned to England Sir James Graham, the first Lord of the Admiralty, told him that "his party was entitled to a

reward of £10,000 for bringing the first information of the fate of the Franklin expedition, and that he would stand in his own light if he did not put in a claim for it." The claim was made and satisfied.

In 1860 Dr. Rae made surveys in the Faroe Islands, Iceland and Greenland for a proposed line of telegraph to America; and in 1864 he began another survey for a line from Winnipeg across the Rocky Mountains. In the course of this latter enterprise he accomplished the descent of the dangerous Fraser River for several hundred miles in a canoe and without a guide.

Dr. Rae published but one book, the "Narrative of an Expedition to the Shores of the Arctic Sea in 1846 and 1847." His other expeditions are described in brief reports addressed to the Royal Geographical Society, and he is the author of papers on the Eskimo, on the navigation of Hudson's Bay, and on Polar exploration; but his written contributions, though they testify to his thoroughness and accuracy and to his rare qualifications, bear no proportion to the magnitude and the solidity of his work. He wrote with simplicity and force, but he was more concerned to do things worthy of record than to record them. He had the gifts of the born explorer, the habit of exact observation, courage and fertility of resource, untiring energy, activity and strength; and with these a firmness and generosity of character that won the respect and the affection of men.

A funeral service was performed in St. John the Baptist's Church, Addison Gardens; but the body of Dr. Rae rests at Kirkwall, in the churchyard of St. Magnus Cathedral.

ISAAC BERNHEIMER.

Mr. Isaac Bernheimer, a Fellow of the American Geographical Society since the year 1859, and for the past nineteen years a member of the Council, died suddenly at Saratoga, N. Y., on the 23d of July last.

Mr. Bernheimer was born in Bavaria in 1812, and early in life removed to this country and entered into business in Philadelphia. In 1849 he established himself in New York as a manufacturer and merchant, and retired from business in 1873 with an ample fortune.

He was a man of amiable disposition and simple tastes, liberal-minded and just in his dealings, and an unostentatious contributor to many charities.